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INDEX.

A

A. (letter). 376
— Budding Pilot, R.A.F. (letter), 418
— 540 m.p.h. Racing Wheel, 16
— Pointed Question, 42
— Regular Despatch Rider (letter), 42
— Rider from 1876 to Date (letter), 199
— Thousand Mile Ride in India, 159
A.A. and Motor Schools, The, 214
— — M.U., The A.G.M. of the, 69
Abbott, Jas. V., 68, (letter) 128
A.B.C., A Shaft-driven? 426
— Cycle Car Transmission, Diagram of (illus.), 502
— Motor Cycle, The, 541
— One Hundred Guinea Cycle Car, The, 447, 502, 554
— Patented Spring Frame for Shaft Drive (illus.), 426
— Post-war Programme, The, 475
— Spring Frame, The (illus.), 410
— The New, 521
Abingdon-Ecco's Exhibit at Birmingham's Win-the-war Day, The (illus.), 312
Abolishing the Bracing Wires, 371
Accommodation for Three, 254
Accumulator Charging, 512
A.C. Engine with Fan Vanes in Flywheels (illus.), 342
Aces, British, 327
Ace, The Psychology of a British, 123
Acetylene, Running on, 292
A.C. Sociable Three-wheeler (illus.), 240
Action, Tanks in, 163
A.C.U. and its Peace Programme, The, 458
— An Open Letter from the Secretary of the, 508
— M.M.D. (letter), 66
— — No. 42 (letter), 85
— — The, 99
Addison, Christopher, The Right Hon., 325
Addresses Omitted, 267
Address Wanted, 134
Adjusting a Hub Gear, 227
Adjustment Chain, 42
— Clutch, 156
— Sturmey-Archer Clutch, 26
Administrative Commissions in the R.A.F., Technical and, 387
Adonis (letter), 101
Advance (letter), 268
Advantage of Two Sparks, The, 190
Advantages of the Countershaft Position, 256
— — — Geared-down Clutch, 256
— — — Tandem Seater, 74
Adventures of an R.A.F. Despatch Rider, The, 223
Advertisements, On Writing (leader), 229
Advertising, Attractive, 204
— Disfigurement, Countryside, 272
Adulteration, 313
Aerial Fighting, Sportsmanship in, 170
— — The Development of, 528
— Liner, A Transatlantic (illus.), 123
— Mails, 479
— Mail, The, 349
— Passenger Service: London to Harrogate, 569
— Post, Indian, 569
— Strength, Comparative, 217
— Transport, Civil, 503
— Works, Ltd. (letter), 554
Aero Engine Induction Joints, 273
— Engines are Started, How, 390
— — Hun, 407
— — on Western Front, Testing Renovated (illus.), 167
— — The Running of, 194
Aero-Motocyclette, The, 173
Aero Plugs in Motor Cycle Engines, 51
— Props, 105
Aeronautical Institute, The, 406
— Inventions, 65
— Lectures, 479
Aeroplane about to Start on its Flight, An, 546
— Armament, The Evolution of, 146
— Bombs, New German, 369
— Construction, Motor Cycles and, 255
— Designed by Hon. H. Burton (illus.), 63
— Engines, Types of, 504
— Hospital, An (illus.), 48
— North Africa to Asia by, 525
— The All-metal, 246
— Wanted, a Non-flam., 284
— Wastage, Hun, 262
Aeroplanes at the Agricultural Hall, Captured German, 13
— Big Bombing, 503
— in all the Air Armies, Not 10,000, 169
— — France, Hospital for Damaged (illus.), 305
— Motor Cycles and, 327
— Silent, 65
After the War, Benzole, 199
— — — French Roads, 202
A.G.A.K. (letter), 356
Ager, E. A. (letter), 484
Age, The Air, 506
A.G.M. of the A.A. and M.U., The, 69
Ahead, Looking, 400, 437
Aid to Profiteering, Procrastination as an (leader), 25
Air Age, The, 506
— Gunnery in the, 306
— Mechanics Attached Balloon Section R.A.F. (illus.), 10
— Screw, The Thrust of the, 80
— — Transmission, Early Experiments with, 173
— Strength, Germany's, 546
— v. Water-cooling, 357
Air-cooled Cylinder, An American Enclosed (illus.), 342
— — being Tested against a Water-cooled (illus.), 269
Air-cooling, 186, 437
— A Further Note on, 19
— by Forced Draught, 341
Aircraft Engine Design, The Influence of, 385, 386
— Fittings of Quality, 378
— Wonders, Naval, 547
Air-gas Ratio, 216
Airman, R.A.F. (letter), 154
Airman Seen Through French Spectacles, The British, 434
Airmen Motor Cyclists, 145
Airtight Joints, Easy Starting and, 355
Aish, Norman, Lt., R.N.V.R. (letter), 200
A.J.S. Sidecar for Two (illus.), 552
— The Military, 477
Albatross D5, A Crashed (illus.), 481
Albion Gears, 502
Alcohol, Carbide Fuel, 287
— from Carbide, 8
— Some Notes on, 75
Alexander, William (letter), 509
Alldays and Onions, Ltd., 90
All-fuel Machine, The, 482
Allied Press Tour, Journalists in Handley Page Aeroplane (illus.), 330
All-metal Aeroplane, The, 246
Allon (letter), 315
— Allon Motor Cycle, An Example of Weather-proofing on a (illus.), 382
— Vertical Twin, The (illus.) 61
All-steel Inflator, An, 468
Ally, A New Product by our Italian, 76
A.L.M.D., B.E.F. (letter), 200
Alp Motocyclet, The (illus.), 210
Alterations, Hub Gear, 134
Altering a Magneto, 338
Altitude Limit, 569
— Record, An, 305
Amateur's Workshop, An (illus.), 542
Ambulance Drivers Wanted, Motor Cyclist, 189
— Sidecar in France (illus.), 289
— Sidecars and Chinook, 153
Ambulance, Suggested by Chinook, A Sidecar (illus), 373
The Campion Sidecar (illus.), 507
— to Carry Two Patients, Sidecar (illus.), 227
— Work in France (illus.), 28, 30
Ambulances, In France with the Sidecar, 28
— Sidecar, 373
America, Consumption Trials in, 33
American, A Good, 484
— Airmen with Crashed Aeroplane in France, Two (illus.), 406
— Aviation Engineers Repairing Damaged Aeroplanes in France (illus.), 569
— Base Port in France, At an (illus.), 189
— Bombing Planes, 63
— Century Flat Twin Two-stroke (illus.), 7
— O.R. Crossing Protected Bridge in a French City (illus.), 346
D.R.'s, 185
— — and the Douglas, 521
— Emblem Twin, to Carry Four People (illus.), 86
— Gallon, The, 108
— Handle-bars in France, 393
— Linesmen with Sidecar Outfit Laying Telephone Wires (illus.), 422
— Machines, British and, 126, 225, 268, 292, 336, 376, 418
— Mascot, An (illus.), 88
— Militaire Bi-car (illus.), 97
— Models, New, 351
— Motor Cycles, British *v.*, 200
— — Cycle Used as Tractor (illus.), 478
— — Cyclists on Western Front (illus.), 78
— Motor-engined Cycle, A, 69
— Navy in British Waters, With the (illus.), 9
— Patents, Some, 334
— Sidecar Models, British and, 417, 464, 487
— Tandem Seat with Footplates (illus.), 310
Americans Repairing Motor Cycles in France (illus.), 226
Among the Trophies, 13
Anderson Auxiliary Motor, The (illus.), 296
Andrews, R. E. (letter), 199
An Appreciation, 445
— Officer (letter), 375
— Old Market Inflated (leader), 359
Another M.T. Corporal (letter), 154
Anti-adulteration (letter), 313
Anti-aircraft Guns in France (illus.), 39
Anti-submarine Patrol, R.A.F., 109
Anzani Radial Aero Engine, The 200 h.p. (illus.), 504
Apparatus for Testing the Barker-White System of Using Alcohol-acetylene Gas (illus.), 287
— Ignition, 204
Appeal, A Manufacturer's, 462
Appreciation, An, 445
A.R. (letter), 199
Arbuthnot, R. K., Rear-Admiral Sir, 172
Archdeacon, Monsieur E., 173
Area of Controllable Surface, 409
Armament, The Evolution of Aeroplane, 146
Armstrong Gear, 377
Army Motor Cycles, Sale of, 462
— — Cycle Waste in the U.S., 258
— of Motor Cyclist D.R.'s, An (illus.), 544
Arnold, A. (letter), 109
A.S.C. Motor Cyclists, The Training of, 279
— M.T. in Persia, The, 223
— M.T.V., The, 304
A.S.L. Spring Frame, The (illus.), 411
Association, Proposed Motor Trade Travellers', 68, 84, 128
Aston, Wilfred Gordon, Capt., R.A.F., 477
Atkinson, A., 204
Atlantic Flight, British Opinion of the, 196
— — The, 145
— Flying the, 196, 455
— Wear and Tear of Machines Crossing the, 121
Atomiser, A Heavy Oil, 258
Attaching a Sidecar, 70

Attachment Embodying a Flat Twin Two-stroke Engine (illus.), 141
Australasia, The Motor Market in, 276
Australia, Good Roads in, 187
– Road Racing in South, 33
– Taking a Machine to, 70
Austrian Aero Engine, A Six-cylinder (illus.), 327
– Flying Boat Captured by the Italians (illus.), 308
– Women Aviators, 79
Austro-Daimler Engine, The 200 h.p. (illus.), 407
Auto-Cycle Union Notes, 501
Auto-wheel, A Cleveland, 280
– Attachment for Cycles, The (illus.), 140
– Patented by the Makers of the Cleveland Lightweight (illus.), 334
Automatic Carburation, 216
– Carburetters, 127
Automobile Engineers, Motor Cycles and (leaderette), 339
Autumn in the Old Days, 549
Auxiliary Engine, Economy of the? 56
– – Embodying a Rotary Sleeve Valve (illus.), 141
Aviation, A Brief Record of Cody's Experiments in, 82
– Post-war Improvements in, 527
– Section, 11, 39, 63, 79, 105, 121, 145, 167, 193, 217, 243, 261, 281, 305, 327, 347, 369, 387, 405, 431, 455, 479, 503, 525, 546, 569
Avro Monoplane, The (illus.), 121

B

Baffling Trouble, A, 270
Bailey Flyer, Flat Twin with Shaft Transmission, The (illus.), 494
Bain, E. C. (letter), 490
Bait, 282
Baker, F. E., 468
Balanced Control Services, 409
Balkan Tap (letter), 128
Ball, Albert, The Late Capt., V.C., D.S.O., M.C., 347
– Bearing, Removing a, 249
– V.C., Letters of Capt., 246
Balmoral (letter), 84
Banking Limit, Finding the, 328
Barimar, Ltd., 468
– – Scientific Welding Engineers (letter), 44
Barker, W. G., Major, 525
– – – – R.A.F., 431
Barnard, S. G., Pioneer (letter), 291
Barnett, J. A., 67
Barometer, The Weakness of the, 148
Barry, Mr. Dean, 27
Barton, J. A. (illus.), 386
Basevi, Edgar E. (letter), 247
Bashall, Aubrey, The Late, 454
Bat Spring Frame, The (illus.), 411
Batteries in France, Motor Machine Gun, 166
Battleplane *v.* Single-seater Scout, Giant, 107
Battman Scott, Aircraft Motor Designer (letter), 314
Baxter, Chief Mechanic, 369
Bayden Singleton, T., Rev. (letter), 247
Bayliss, Thomas, and Co. (letter), 42
Bearings, Gilless, 258
Beauchamp-Proctor, A. W., Lt. (Acting Capt.), 525
Bedelia Cycle Car (illus.), 75
Beech Thomas, W., 326, 331
Behrendt, O., T. Lt. (Act.-Capt.), R.E., 331
Beldam Tyre Co., 378
Bell, W. J. R. (illus.), 564
Belt, A Slipping, 313
– Fasteners, 204
– in Cold Weather, Mending, 470
– Rim, Truing a, 110
Belts, Gears and, 579
Benn, Ernest J. P., 56
Benz Aero Engine, A (illus.), 481
Benzole, 510, 529, 574
– after the War, 111, (leader) 199
– Release of, 521
– The Future of (leaders), 49, 109
Bernardi, Froissart *v.*, 170
Berry, E. G., Major, 374
Bertram, R. R. (letter), 201
Besquand (letter), 417
Best Position for the Clutch, The, 256, 357
– Type of Transmission Shock Absorber, The, 332
Bettinson, Geo. H. (letter), 579
Bianchi Motor Cycle (illus.), 76
Bi-car, The, 97, 335
Bickford, J. S. V., B.A., The Late, 522
Bicycles, 267
– Two More Motorised, 296
Bicycle, The Motorised, 140
Big Bomber, How to Engine a, 168
– Twin (letter), 224
– – One Thousand Miles on a, 96
Biggs, T. J., 468
Binker (letter), 176
Binks, C., 247, (letters), 292, 336, 514
Four-cylinder Motor Cycle, The (illus.), 104
Three-jet Carburetter, 192, 247, 267, 293, 336, 357, 438, 511
Birmingham M.C.C. Twelve Hours Trial to York (illus.), 537
Bishop, S. (letter), 84
– W. A., Lt.-Col., 261
Black List, A Motorists', 24
– – The, 134
B.L.I.C. Magneto Compared with Gas Engine Magneto (illus.), 345
Magneto, The, 304
Bluing Soldered Metal, 203, 294
Steel, 582
B.M.C.R.C., The, 522
Bob-weight (letter), 357
Boches Chasseurs des, 217
Bock and Hollender Motor Cycle, The (illus.), 102
– – – Sbaft-driven Four-cylinder Machine, 494
Body, A Simply-constructed Sidecar, 237
Bomber, How to Engine a Big, 168
Bombing Aeroplanes, Big (illus.), 503
– a Transport Column, 261
– Developments, Daylight, 41
– Ground Speed and, 147
– Planes, American, 63
Raids, About Night, 218
Bombs, New German Aeroplane, 369
Boom, Greeting the New Motor Cycle, 452
Bosch Magnetos in Australia, 120
Botany (letter), 267
Boursiac, Henri (letter), 314
Bowden Brake Co., 386
– – – Ltd., 468
– Wire Co.'s Extension, The, 501
– – Nipple for, 112
– Wires, Soldering, 294
Boyd, R. L. (letter), 577
Boys of the Old R.N.A.S., 217
– Welfare Section, The, 309
Bradbury and Co., 378
Brace, A Few Tips on the Use of a Yankee, 318
Bracing Wires, Abolishing the, 371
Bradbury, Dan, 522
– Kick-starter, The, 551
Bradford, J. T., 468
Brakes, Front, 43, 84
– Hand, 275
Braking Effects, 40
– Systems, 309, 578
Brampton Spring Fork (illus.), 114
– – – Device, The (illus.), 278
– – Frame, The (illus.), 410, 437
Brancker, William, Maj.-Gen., 79
Brazing Cast Iron, 490
– Frame Construction without, 378
Breakage, Chain, 582
Breaking a Flywheel Key, 110
– Exhaust Valve, 89
– Piston Rings, 338
Breezy Spot, A, 259
Bresler, S. (letter), 437
British Aces, 327
– Ace, The Psychology of a, 123
– Airman Seen Through French Spectacles, The, 434
– and American Machines, 126, 225, 268, 292, 336, 376, 418
– – – Sidecar Models, 417, 464, 487
– Conservation, 391
– Export Trade, Increasing the, 190
– Henderson Flat Twin, A, 502
– Machines, 560
– – in the French Army, 214
– Magnetos, 248, 335, 366
– Opinion of the Atlantic Flight, 196
– Planes during Final Attack on Germans (illus.), 570
– Scientific Products, 171
– *v.* American Motor Cycles, 200
– – Yankee, 340
Broken Cotter, A, 108
– Pulley Flange Repair, A, 375
Broome, Ralph, Maj., D.S.O., M.C., 101
Brophy Springing System, The, 514
Brough Coil Spring Device, The (illus.), 410
– Model, The New, 562
– The 3½ h.p. Flat Twin (illus.), 562
Brown, C. P., Flight Commander, 327
– L. G. (letter), 511
– S. P., 507
Browning, Herbert, Lt., R.G.A., A.A., 507
Bruce, J. (letter), 44
Brunell, W. J., 429
Brushes, Substitute for Carbon, 318
B.S.A. Co., The, 204, 378
– Front Brake Operating on Belt Rim, The (illus.), 321
B.S.A.'s in East Africa, 468
Bubbles, Cycle Car, 300
Buckingham, P. E., Lt. M.C., R.A.F., 520
Building a Cycle Car, 228
Bullock, W. F., 63
Bumps and Dunts, 456
Burdett, E. P. (letter), 224
Burnard Rotary Engine Design, The (illus.), 256
– S. L. (letter), 335
Burney, C. S., Lt. R. E., 33
Burton, The Hon. H., 63
Bush, Extracting a Small End, 182
Business, A Motor Cycle for, 294
Busy Scene Outside Bapaume during British Attack (illus.), 304
Butterfield, A., 77

C

Cadbury, Egbert, Maj., D.S.C., D.C.F., 305
Cade, C. A., D.R., R.E., 524
Caird, D., Ministry of Munitions (letter), 314
Cairo, A Scene in (illus.), 67
– to Jerusalem, 45
Calcutta, Motor Cycles in, 186
Call to Clubs and Others, A, 508
– – Women, A, 374
Camber, Variable, 67
Campion Sidecar Ambulance, The (illus.), 507
Camshaft or Cam Wheel, 184, 268
Cam Wheel, Camshaft or, 184, 268
Cancelling a Sale, 156
Canyons, In the Country of the, 206
Capabilities of a Machine, 178
Capacity and Power, The Units of, 55
Caproni Biplane in Flight, An American (illus.), 527
– Triplanes, A Squadron of the Famous (illus.), 369
Capt., R.A.F. (letter), 225
Carbide, 258
– Alcohol from, 8
– as Fuel, 406
Fuel, Alcohol, 287
– The Release of, 501
Carbon Brushes, Substitute for, 318
Carburation, Automatic, 216
Carburetter, 90
– A New Model Schebler, 551
– – – Schebler, 429
– Conversion, 398
– Design, 488
– – An Interesting, 151
– – Notes on, 352
– Flooding, 24, 70
– The Binks Three-jet, 192, 247, 267, 293, 336, 357, 395, 438, 511
Carburetters, Automatic, 127
– One-lever (leader), 1, 53, 66, 84, 119, 155, 226, 292, 293, 336, 356, 395
– The Design of Single-lever, 208
Careers, French Pilots' Plans for their Future, 546
Carrier Riding, The Case for, 517
Carrying Patches, 419
– Petrol Squirt, 318
Carter, William (letter), 174
Case, A Curious, 463, 487, 530
– for Carrier Riding, The, 517
– – the S.P.C.M.C., A, 532
– of the Unstable Machine, The, 328
Cast Iron, Brazing, 490
Casual Notes, Some, 72
Catterick (letter), 21
Caucasus Mountains, A Scene in the (illus.), 101
Cause of Knocking, A, 84
C.A.V. Athletic Sports, 257
Cayenne Water-cooled Engine, The 3½ h.p. (illus.), 298
C.C., How to Find the, 556
Ceco Cycle Car, The (illus.), 74
Centre, How to Find the, 112
Civil Aerial Transport, 503
Chain Adjustment, 42
– Breakage, 582
– Lubrication, 467
– Pull Chart, 100
Chains, Enclosed, 483
Chair of Aviation, 105
Changing the Sidecar Wheel, 20
Chapman, J. P. J. (letters), 291, 356, 487
Charging, Accumulator, 512
Charity Corner, 311
Charm of the Four-cylinder, 231, 313
Chart, Chain Pull, 100
Chasseurs des Boches, 219
Chassis Design, Sidecar, 561
Chater-Lea Internal Expanding Brake, The (illus.), 321
Chats on Motor Cycle Problems, 15
Cheap Cycle Car, Henry Ford and the, 401
Checking Inward Sideslip, 328
Chemical Query, A, 490
Chemico Tyre Patch Carrier, The (illus.), 419
Chevreux, Maurice, 121
Chimpanzees with Miniature Sidecar Combination (illus.), 19
Chinook (letters), 201, 226
– Ambulance Sidecars and, 153
– Decoration for, 280
– in the Yorkshire Hills (illus.), 290
Chisholme, Miss Mairi, 239
Choice of Three-wheelers, Wanted More, 175, 357, 394
Choosing a Machine, 467
–the Type of Magneto, 183
Christmas, 1918 (leader), 533
– Petrol for, 529
– Trials of Pre-war Days, 536
Clarke, H., The Late Capt., 101
– W. J., Cpl. (illus.), 309
Clark, Eli (illus.), 537
Clarkson, R. W. (letter), 108
Claxton, W. G., Lt., D.F.C., 327
Clayton, M. (letter), 531
Cleaning off Rust, 249
– Plugs, 509
Cleveland Auto-wheel, A, 280
– Engine and Gear Box, Part Sectional Elevation of (illus.), 551
– Lightweight for 1919, The, 551
Cliff and Sons, W., 478
Climbing Speeds, 369
Clothing, Electrically-heated, 14
Clover, In, 224, 267, 356
Club News, Motor Cycle, 507
– The Despatch Riders', 454, 507, 511, 524
– – Royal Air Force, 406
Clubs and Others, A Call to, 508
Clutch Adjustment, 156
– – Sturmey-Archer, 26
– Advantages of the Geared-down, 256

Clutch Control, 471
— Cover, A, 180
— Douglas Handle-bar Controlled (illus.), 376
— in the Countershaft, 577
— Slip, 178
— — A Device to Cure, 470
— The Best Position for the, 256, 357
— Trouble, 316
Clutches, Notes on, 427
Clyno, A Run on the Post-war, 486
— Engineering Co., The, 85, 468
— Machine Gun Battery in France (illus.), 223
— — — Outfits in France (illus.), 57
— Outfit on Western Front (illus.), 100
— The Post-war, 453
— Weatherproofing on (illus.), 382
Coal Gas for Commercial Vehicles, Compressed, 84
— — — Motor Vehicles, 545
— — Running on, 48, 442
Coates, T., Sec.-Lt., A.S.C. (illus.), 331
Coath, Gerald (letter), 336
Cody, Col., 63
— Samuel Franklin, 82
Cody's British Army Flier (illus.), 82
— Experiments in Aviation, A Brief Record of, 82
Coes, P. R. (letter), 393
Coiffard, Ltd., The Late, 431
Coil Ignition, Dynamo Lighting and, 62
Collishaw, R., Lt. (Tem. Maj.), D.S.O., D.S.C., D.F.C., 327
Colmore Cup Trial, 1914, A Meet of Competitors for the (illus.), 447
Colonial (letter), 579
— Use, Motor Cycle for, 394
Combined Raincoat and Cover, A (illus.), 334
Coming Cycle Car, The, 361, 418, 464, 509, 555, 578
Commercial Vehicles, Compressed Coal Gas for, 84
— — Motor Numbers on, 303
Commissions in the R.A.F., Technical and Administrative, 387
Comparative Aerial Strength, 217
Comparison in the Cost of Travelling, 171
Competition, An Interesting, 269
Competitions and the Public, 459
— of 1919, The (leader), 491
— Post-war, 214
— Single v. Twin in, 125
— The Single-cylinder in, 42
Compliments of the Season (illus.), 535
Compressed Coal Gas for Commercial Vehicles, 84
Compression, A Two-stroke with Variable, 385
— Loss of, 338
— No, 249
— Release Valve, 204, 224
— To Find the, 316
Concession, Petrol Restrictions, Further, 511
Condition of the T.T. Course, The, 577
Connecting Rods, Twin, 490
Connection, Improved Sidecar, 90
Connections for Spring Frames, Sidecar, 468
Constant Lift, 64
Consumption Trials in America, 33
— Weight, Speed, and, 24
Controllable Surface, Area of, 409
Control of Motor Cycles, Disabled Men and the, 573
— — Rubber Industry, 366
— Services, Balanced, 409
— Speed Gear (leader), 399
Controls, 578
Conversion, Carburetter, 398
— Magneto, 358
Converted Magneto, Electric Lighting from, 33
Converting a Single Speed to a Two-speed Model, 516
Cooling and Valve Breakages, 158
— A Suggested Method of, 269
— the Induction Pipe, 207
— Unequal, 224
Cooper, J. (letters), 174, 267
— Particular Side Valves, The (illus.), 138
— W. (illus.), 537
— — Lt., A.S.C., M.T. (illus.), 520
Cornfield, Landing in a, 121, 167, 169, 225
Corporal-mechanic R.A.F. (letter), 555
Corporal R.G.A. (letter), 337
Cost, Cutting Down the, 533
— of Post-war Machines, 50
— — Travelling, A Comparison in the, 171
Cotter, A Broken, 108
Countershaft, Clutch in the, 577
— Gears, 582
— — Hub and, 395
— Position, The Advantages of the, 256
Country of the Canyons, In the, 206
Countryside Advertising Disfigurement, 272
County Cycle and Engineering Co., 378
Coventry Motor Club's Sweepstake, 164
Cover, A Clutch, 180
Cowdray, Lord, 406
Cox, Archie, 478
— D. S., Sec.-Lt. (illus.), 404
Crashed British Aeroplane, A (illus.), 347
Craven Two-seater, The (illus.), 254
Creighton, Ernest (letter), 438
Crimes and Comments, Petrol, 87
Crippled (letter), 267
Crisis, The Motor Cycle and the Fuel (leader), 251
Criticism, Severe, 393
Critics, The, 15
Cross-country and Overseas Flying, 244
Crosshead Piston, The Ricardo, 396
Crouch Three-wheeler, The (illus.), 240
Crowd, Trenchard's, 350
Cunliffe, W. W. (letter), 438
Curious (letter), 268
— Case, A, 463, 487, 530
Current Chat, 8, 34, 56, 77, 99, 120, 143, 164, 188, 213, 238, 257, 280, 303, 325, 346, 366, 386, 405, 428, 454, 477, 500, 521, 544, 563
Curtiss Eight-cylinder V type Aero Engine, The (illus.), 505
— Glenn H., 79
Cutting Down the Cost, 533
C.W.D. (letter), 511
Cycle, A New American Motor-engined, 69
— Car, An Ingenious, 221
— — Bubbles, 300
— — Building a, 228
— — Henry Ford and the Cheap, 401
— — The A.B.C. One Hundred Guinea, 477, 502, 554
— — — Ceco (illus.), 74
— — — Gibbons, 152
— — — Real, 2
— — — Single-cylinder, 73
— — — Tandem-seated, 74
— — — Very Simple, 21, 165
— — Three-wheeled, 240
— — What is a? 231
— Cars, 21, 224, 268, 336, 529
— — Steam, 247
— — Three-wheeled, 394, 438
— Motor, The (illus.), 141
— The Steam (leader), 205
Cyclone Three-wheeler, The (illus.), 241
Cygnet Outfit, A Weatherproofing Idea adapted to an American (illus.), 383
Cylinder, A Vacuum Aft of the, 463
— Over-oiling in Rear, 110
— Which is Number One? 294
Cylinders, Decarbonising, 291

D

Damage on Rail, 398
D'Annunzio Gabriell, Maj., 193, 281, 327, 347
Data, Incomplete, 134
Date of Manufacture, 467
— — Second-hand Motor Cycles, 85
Davenport, W. A., 191
Davies, H. R., 145
Davis, Capt. F. J. (illus.), 281
Day Bombing Squadron on the Western Front (illus.), 245
— Sapper (illus.), 46
Daylight Bombing Developments, 41
Dayton Internal Expanding Brake, The (illus.), 321
— Motor Assisted Cycle, The (illus.), 140
Dean Barry, Mr., 27
— G. D. (letter), 335
Deane, Harold (letter), 108
Decarbonisers, Experiments with, 187
Decarbonising Cylinders, 291
— Two-stroke, 316
Decompressor, A Simple Home-made, 112
Decompressors, Home-made, 199
Decorating the Planes, 81
Decoration for Chinook, 280
Demand, Post-war Supplies and, 322
Demobilisation, 429
— Estimate, 374
Demoiselle, The, 105
Design, An Interesting Carburetter, 151
— A Rotary Engine, 236, 335
— Carburetter, 488
— Notes on Carburetter, 352
— of Single-lever Carburetters, The, 208
— Sidecar Chassis, 561
— The Influence of Aircraft Engine, 385, 386
Designs for Shaft Drive, Some Suggested, 332
— Some Unconventional Valve, 138
— The New Spring Fork, 278
Designers, Dud Gear Box, 268
Despatch Rider in Neighbourhood of the Suez Canal (illus.), 414
— — on Douglas near Cairo (illus.), 118, 125
— — The Adventures of an R.A.F., 223
— Riders, American, 185
— — An Army of Motor Cyclist (illus.), 544
— — Club, The, 454, 507, 511, 524
— — in Palestine, A Group of (illus.), 404
— — of the Jungle, 46
Detachable and Interchangeable Wheel, 90
— Heads, 355, 487
— Tanks, 105
Development of Aerial Fighting, The, 528
Developments, Daylight Bombing, 41
Device, An Easy Starting, 117
— A Spring Frame, 176
— Fitting a Hot Air, 532
— Puncture Preventing, 212
— to Cure Clutch Slip, A, 470
Dewberry, A. (letter), 462
Diagram of A.B.C. Cycle Car Transmission (illus.), 502
Diamond Frame Inserted in Cycle Frame, An Extra (illus.), 378
— Motor Cycle, The (illus.), 268
— The Peace Model, 507
— — Post-war 2½ h.p. Two-stroke (illus.), 507
Difficult Starting, 228
Difficulty in Starting, 67, 109, 200, 294
Dignity and Impudence (illus.), 368
Dimensions, Four-cylinder Engine, 211, 291
Directional Stability (leader), 379, 380
Disabled Men and the Control of Motor Cycles, 573
— Motor Cycles for the, 130
— Rider, Machine for, 227, 247
Discharged (letter), 291
— Soldiers and Sailors, Petrol for, 477, 500, 501
— — Petrol for, 174, 226, 267, 291, 336, 355, 428
Discussion, A Topic for, 134
Disfigurement, Countryside Advertising, 272
Disgusted (letter), 530
Dissolved Acetylene, Running on, 292
Dive, 124
Does a Sidecar Skid? 401
Double Piston Ring, An Ingenious (illus.), 33
Douglas, American D.R.'s and the, 521
— F., Sapper, 309
— Handle-bar Controlled Clutch (illus.), 376
— Motor Cycles, The Sultan of Egypt's Bodyguards with (illus.), 108
— Outfits in Mesopotamia (illus.), 93
— P. C. D., Lt.-Cr., R.N.V.R. (illus.), 212
— — R.N.V.R., The Late, 193
— Spring Frame, The (illus.), 411
— Timing, 377
— The Doughty, 214
— 2¾ h.p. Lady's Model, The (illus.), 425
— V Four Motor Cycle (illus.), 103
Dover, Fred, 520, 522
— T., Pte. (illus.), 520
Drew, W. H., 405
Drip Feed v. Mechanical Pump, 471
Drive, Friction, 556
Driving, Petrol for Teaching, 203
D.R. (letter), 463
— of the New Zealand Division Signal Co. with Triumph Motor Cycle (illus.), 191
— R.A.F. (letter), 176
— R.G.A. (letter), 85
— V.C., A, 178
D.R.'s and Cavalry in Wrecked Village on the Western Front (illus.), 325
— Bartering for Oranges in Palestine (illus.), 302
— Danger and Curious Cause of Misfiring, 10
— Experience in Salonica, A, 374
— in German E. Africa (illus.), 46
— — Italy Tyre Repairing, A Group of (illus.), 500
— North-west of Jerusalem (illus.), 43
— on Triumphs in Egypt (illus.), 249
Druid Spring Fork (illus.), 114
Dud Days, 263
— Gear Box Designers, 268
Dudley (letter), 355
Dugouts for Aeroplanes (illus.), 11
Dunlop Rubber Co., The, 431, 468
Dunts, Bumps and, 456
Duration Records, The, 247
Durban and Maritzburg, A Picturesque District between (illus.), 484
Durkopp Four-cylinder Motor Cycle, The, (illus.), 102
Du Rose, Cpl. (letter), 10
— — S. C. (letter), 393, 487
Durston, G. H., Cpl., R.E. (letter), 437
Duryea Three-wheeler, The (illus.), 242
Dynamo, Fitting a, 582
— Lighting and Coil Ignition, 62
— — Set, Simplifying the, 234

E

Eadington, W., 507
Early Quads, The, 126, 181
Eastwood, C. R. (letter), 293, 395
East Yorkshire Motor Volunteer Corps (illus.), 99
Easy Starting and Airtight Joints, 355
— — Device, An, 117
— — Tip, 112
Economical Motor Cycle, The, 415
Economisers, 442
Economising Material, 354
Economy of the Auxiliary Engine? 56
— Petrol, 364
Edmund Spring Frame, The (illus.), 411
E.F.S., 2nd-Lt. (letter), 128
Egyptian Desert, A Repair in the (illus.), 277
Election, Motor Cyclists and the, 496
Electrical and Others, 203
— Motor Cycle, An, 316
— Units, 54
Electrically Heated Clothing, 14
Electricity, Gas or, 483
Electric Lighting, 85
— — from a Converted Magneto, 33
Elevator, 124
Eliminating the Glare, 95
Ellis, J. W. R., The Late Sgt. (illus.), 428
— W., 468
Emancipation Day! 477
Empennage, 124
Emptying Petrol Tank, 470
Enamel, Removing, 144
Enclosed Chains, 483
Enfield, A Heavily Loaded (illus.), 454
— Autovette, The (illus.), 241
— Cycle Co., Report of the, 386
— Machine with Leg Shields and Valve Cover (illus.), 187
Engaging a Zepp., 432
Engine, An American Rotary, 6
— a Big Bomber, How to, 168
— — New, 217
— — Pilot's, 480
— — Slide Valve, 551

Engine Design, A Rotary, 236, 335
— — The Influence of Aircraft, 385, 386
— Dimensions, Four-cylinder, 211, 291, 335
— Embodying a Rotary Sleeve Valve, Miniature Auxiliary (illus.), 141
— Lubrication, 468
— of the Future, The, 500
— Question re an Old, 227
— Starters, Mechanical, 187
— Stationary, 442
— The Oerlikon, Internal Combustion Rotary, 6
— — Pilot and his, 570
— — Six-stroke, 402
— — Victor Flat Twin, 518
— Timing an Old, 398
— — Protractor for, 112
— within the Propeller Boss, An, 14
— with Inverted Piston, An, 119
Engineer (letter), 109
— The Real, 76
Engines, 457
— Four-cylinder Motor Cycle, 127
— Horizontal Rotary, 94
— Run Aero, 407
— Long Stroke, 20, 85, 201
— Radial, 579
— Rotary, 335
— Some Notes on Flat Twin, 558
— The Running of Aero, 194
— — Timing of the Norton, 33
— Torque in Motor Cycle, 301
— Types of Aeroplane, 504
English Oilfields, Ltd., 143
— Rollo Cycle Car, The (illus.), 75
Equipment Inspection at a Tankdrome (illus.), 143
— The Motor Cyclist's Workshop and its, 542
Etic Three-wheeler, The (illus.), 240
Evans, R. H., Cpl., R.E. (illus.), 374
Everest, Ernest P. (letter), 201
Evolution of Aeroplane Armament, The, 146
E.V.P. (letter), 42
E.W.B. (letter), 554
Excelsior, An Example of Weatherproofing on an (illus.), 382
— Spring Fork (illus.), 115
— The 1919 (illus.), 351
— Three-speed Gear Box (illus.), 352
Excelsiors, 1919, 574
Executive Officer's Mount, An, 109
Exhaust Flames and their Meaning, 297
— Poppet Valve Design, 21
— Thottle, An, 294
— Valve, Breaking, 89
Exhibition, The R.A.F., 481
Exhibits at Olympia from the Gallery (illus.), 465
Experiences Wanted, 178, 250, 490
Experiments with Air Screw Transmission, Early, 173
— with Decarbonisers, 187
Explosion Pressure and Vibration, 108, 154
Export Trade, Increasing the British, 190
— — Restrictions on (leader), 557
Exports, Imports and, 78, 280, 366, 470, 544
Expresses of the Future (illus.), 525
Externals, Internals or, 162
Extracting a Small End Bush, 182
Ex 29th Division (letter), 336

F

Fabric, 124
Factor of Safety, 124
Fafnir Water-cooled r. Twin Engine, The (illus.), 298
Fairbrother, John (letter), 109, 464
Fair Do's (letter), 554
— Lead, 124
— Play (letter), 66
Fairing, 124
Fairlam Horn, J. (letter), 577
Farm, The Motor Cycle on the (illus.), 55
— Tractor Handbook, The, 517
Fasteners, Belt, 204
Feminine Goggles, Through, 129, 553
Fenn, A. G., 303, 418, 509
Fewer Parts (leader), 157
Fighting 'Plane, An R.A.F. (illus.), 169
— 'Planes, The Guns of, 146
— The Development of Aerial, 528
Files, A Use for Old, 522
Fin, 220
Find the Compression, To, 316
Finding the Banking Limit, 328
Finish, A Non-rusting Toolproof, 543
— Wanted, a Non-rusting Toolproof, 319, 355, 462, 554
Finishes, Rustless Steel, 444
Fins, Streamlined, 158
First Spiral Nose Dive, The, 199, 224
Fitting a Dynamo, 582
— — Hot Air Device, 532
— — Hub Gear, 110
— Shop of a German Factory (illus.), 262
Five Miles High, A Room, 263
— Speeds and Reverse, 133
Five-speed Gear Box Designed by S. A. Bagley (illus.), 133
540 m.p.h. Racing Wheel, A, 16
Fixing the Gudgeon Pin, 224
— Transfers, 48
Flange Repair, A Broken Pulley, 375
Flap, 220
Flat, 314
— Four with Integral Gear Box, A, 362
— Twin, A British Henderson, 502
— — — Harley-Davidson? 280, 288
Flat Twin Engine, The Victor, 518
— — Engines, Notes on, 558
— — Two Thousand Miles on a Humber, 323
— — Wooler, The, 485
— Twins, Oiling, 180
Fleet of Ten Thousand Raiders, 122
Flexo Waterproof Saddle Top, The (illus.), 419
Flight, British Opinion of the Atlantic, 196
— Opinions of Post-war, 455
— The £ s. d. of, 433
Flooding, Carburetter, 24, 70
Flugel and Co., Ltd. (letter), 84
Flying, and the Instruments, 526
— Facts and Theories, 12, 64, 80, 106, 147 409
— over Towns, 121
— Poilu, The, Reviewed by Torque, 389
— Position, 220
— Speed, Judging, 329
— the Atlantic, 196, 455
— Transatlantic, 79
— Wires, 220
Flywheel Key, Breaking, 110
F.N. Four-cylinder Motor Cycle, The 4-5 h.p. (illus.), 103
— — — — 7 h.p. (illus.), 103
— Motor Cycle with Shaft Drive, The 7-9 h.p. (illus.), 494
— — — — — — 2½ h.p. (illus.), 495
Fonck, Lt., 247, 369, 569
Footboards, 180
Foot Control, Wanted a, 394
Foot-operated Two-speed Gears, 158
Forced Draught, Air Cooling by, 341
Force Feed Oil Pump, A Throttle-controlled, 441
Ford and the Cheap Cycle Car, Henry, 401
— F. J. (letter), 224
— Motor Cycle, A, 391
Foreign Trade, 100
Foresti Flat Four Engine (illus.), 104
Forks, Spring, 422
Forsberg, S. O. J., Sgt., 191
Four-cylinder Design, A Unique (illus.), 104
— Engine Dimensions, 211, 291, 335
— Motor Cycle Engines, 127
— — Cycles, 102, 200
— The Charm of the, 231, 313
Four Cylinders (letters), 154, 201
— — and Water Cooling, 18, 127
— — in One, 439
Four-engined Gothas, 219
Four-speed Gears, 471
Four Speeds, Three Speeds or, 375, 509
Frame, A New Sun-Vitesse, 92
— Construction without Brazing, 378
— The Spring, 580
Frames, Spring, 52
— Standardised, 462
— Straight Tube, 555
— Two Types of Triangulated (illus.), 92
France, Motor Machine Gun Batteries in, 166
— with the Sidecar Ambulances, In, 28
Franklin Car Engine, The (illus.), 341
— C. B., 164
Free Engine with N.S.U. Gear, 316
Freeman, A. D. (letter), 42
— A. M. (letter), 22
French Army, British Machines in the, 214
— Doctors with Sidecar Ambulances (illus.), 198
— D.R. with Gas Mask, A (illus.), 260
— Pilots' Plans for their Future Careers, 546
— Roads, 199
— — after the War, 202
— Seaplanes about to Start on a Bombing Expedition (illus.), 434
— Sidecar Ambulances, 239
— Spectacles, The British Airman seen through, 434
— Water-cooled Vertical Twin Engine, A (illus.), 300
Friction Drive, 556
Friction-driven Motor Cycle, The, 274
Friction, Lubrication and, 258
Friendly Rivalry, 23
Front Brakes, 23, 43, 84
— Wheel Springing, 114
— — Trail, 265
Froissart v. Bernhardi, 170
F.S.R. (letter), 127, 293
Fuel, 577
— Alcohol Carbide, 287
— Carbide as, 406
— Crisis, The Motor Cycle and the (leader), 251
— Home-produced, 143, 213, 366
— Production, 120
— To Exploit Home-produced, 100
Funck and Miniature Cycle Car, Mr. Georges (illus.), 368
Fund for Disabled, King's, 378
Furdson, Clement, 545
Furious, H.M.S., 547
Further Note on Air Cooling, 19
Fuselage, 220
Future of Benzole, The (leader), 49, 109
— Peace! What of the, 446

G

Gadgets that Tell, 531
Gallipoli (letter), 355
Gallon, The American, 108
— Ton-miles per (leader), 179
Galvanising, 529
Gap, 264
Gap-chord Ratio, 264
Gardner, Eric H., 530
— E. S. (letter), 375
Garros, Lt., 369
Gas or Electricity, 483
Gate Change, The, 471
Gaunt, C. (letter), 248
Gauntope, B.E.F. (letter), 291
G.C. (letter), 577
Gear, Armstrong, 377
— Box, A Flat Four with Integral, 362
— — Designed by S. A. Bagley, A Five-speed (illus.), 133
— — Designers, Dud, 268
— — Lubricating the, 242
— — Lubrication, 48
— Changing, 48
— Control, Speed (leader), 399
Geared-down Clutch, Advantages of the, 256
Gears, Albion, 502
— and Belts, 579
— — Sparking Plugs, 250
— Countershaft, 582
— Foot-operated Two-speed, 158
— Four-speed, 471
— Hub and Countershaft, ???
Generator to Sidecar Lamp, Pipe from, 318
Gerhart Four-cylinder Motor Cycle, The (illus.), 102
German Aeroplane Bombs, New, 369
— — Factory, A General View in a (illus.), 258
— — — The Fitting Shop in a (illus.), 262
— Aeroplanes at the Agricultural Hall, Captured, 13
— Anti-tank Artillery, 300
— Bombs, A Contrast in (illus.), 350
— D.R. and his Mount (illus.), 200
— — Wearing Gas Mask (illus.), 366
— D.R.'s Machine, The, 172
— Gotha, A—Crashed (illus.), 261
— Sausage, Strafing a, 145
Germany's Air Strength, 546
— Premier Biplane, 347
Gerrard, Walter, Capt., D.S.O., 101
G.H.B. (letter), 395
G.H.H. (letter), 375
G.H.J. (letter), 66
Giant Battleplane v. Single-seater Scout, 107
Gibbons Cycle Car Co., The (letters), 464, 578
— — — The, 152
Gibbs, G. K. (letter), 462
Gibson, George T. (letter), 509
Gilbert, H. (letter), 224
Glare, Eliminating the, 95
Glide, 264
Glossary of Flying Terms, 124, 220, 264
G.N. Cycle Car, The, 478
Gnome Aero Engine, The Seven-cylinder (illus.), 504
Godfrey, Lt., 145
Godsell, Pte. (letter), 10
Goggles, Through Feminine, 129, 553
Golden Age Recalled, The (illus.), 436
— A. W., Sgt., M.M., D.C.M., 309
Good American, A, 484
Gordon-Bell, C., Capt., R.A.F., The Late, 120
Gothas, Four-engined, 219
Gotha which Bombed London, A (illus.), 480
Grant, Cpl. (illus.), 46
Green, H., R.A.F. (letter), 86
Green-Precision Self-contained Water-cooled Engine, The (illus.), 299
Greenwood, John Ernest, 468
Greeting the New Motor Cycle Boom, 452
Gregg, R. C. (letter), 267
Grenfell, John G. (letter), 292
Greyhound Tandem-seated Bi-car (illus.), 98
Grindon Hill in the 1914 A.C.U. Six Days' Trial (illus.), 131, 175
Grocock, H., Act.-Cpl. (letter), 118
Ground Speed and Bombing, 147
— Strafing, 408
Grover, Douglas W. (letter), 293
G 6156 (letter), 357
Guarding against Rheumatism, 266
Guards Examining Papers of D.R.'s on Belgian Front (illus.), 24
Gudgeon Pin, Fixing the, 224
— — Removing the, 377
Gun Batteries in France, Motor Machine, 166
Gunnery in the Air, 306
Guns of Fighting 'Planes, The, 146
Guynemer, 525
G.W. (letter), 462

H

H.A. (letter), 21
Hairpin Bends, 248
Hall, Fred, 522
— F. R. (letter), 269
Hall-Scott Water-cooled Aero Engine, The (illus.), 505
Hambling, Frederick H., 335
Hampton, P. W., Maj., R.A.M.C. (letter), 529
Hand Brakes, 275
Handford, A. (letter), 108
Handle-bar Controlled Clutch, Douglas (illus.), 376
Handle-bars, 417, 464
Handley Page Aeroplane, The Nacelle of a (illus.), 40
— — — used for Bombing Purposes (illus.), 525
Hangar, 264
Hannaford, C., Senr. (letter), 126
Harding Two-stroke Two-cylinder Air-cooled Engine (illus.), 492

Harkenrider, Louis H., Pte., 303
Harley-Davidson Climbing Whitedown Hill (illus.), 215
— fitted with Remy Generator (illus.), 235
— Flat Twin, A ? 280, 288
— — — (illus.), 353
— Lightweight, The (illus.), 541
— Motor Co., The, 204
— Outfit, An (illus.), 165
— Owner starting up (illus.), 56
— Side-by-side Sidecar (illus.), 254
Spring Frame, The (illus.), 288
— The 1918, 175
— — 1919, 215
Harman, A. T., Pte., D.F.M., 305
Harper, John (letter), 418
Harrison, Chas. W., A.M.Inst.C.E., A.M.I. Mech.E. (letter), 200
— John (letter), 291
Haslam, J. (letter), 175
Hathaway, A Two-stroke Engine Designed by D. J. (illus.), 119
Hatton, J. L. S., M.A., 79
Head Lights, 570
Heads, Detachable, 355, 487
Heath Graham, Lt., R.A.F. (illus.), 239
Heating Induction Pipe, 26
Heavy Oil Atomiser, A, 258
Heckman, J., 258
Hedges, Frank, 525
Height Record Beaten by American Airman, 479
Helicopter, 264
Help the War Loan, To, 109
Hemp Seed, Oil from, 100
Henderson Flat Twin, A British, 502
— Four-cylinder Motor Cycle, The American (illus.), 103
— Leonard B., A.M.I.A.E. (letter), 578
— Sidecars, 507
— Spring Fork (illus.), 115
— The 1919 (illus.), 351
Henham, J., Pte., D.C.M., 309
Henshall, L. S., Maj., D.S.O., 101
Herdtle-Bruneau Engine and Friction Set (illus.), 274
Here and There Questions, 227
— — — with the Luxury Tax, 285
Hewitt, Pte., Tanks (illus.), 10
H.F.S. (letter), 511
Hiawatha and Minnehaha (illus.), 19
Higher Gears for Solo Riding, 21
Hills and Back Again, Over the, 343, 437
Hillyard, G. W., Commander R.N., 172
Hindle, Thos. (letter), 529
Hints on Rebushing, 182
Hiring a Machine, 203
Hitchcock, M. (letters), 268, 357
H.M.S. *Furious* (illus.), 547
Hobart Cycle Co., Ltd. (letters), 437, 468
— Outfit in the Country, A (illus.), 558
Hobbs, H. G. M., 554
Holiday Makers, Petrol for, 174
— Petrol, 173
— — except for Munitioneers, No, 116
Holland, John (letters), 43, 155, 268
Hollis, A. E., Cpl., M.M. (illus.), 374
Holt-Thomas, Mr., 455
Holy Land, In the (illus.), 302
Home-made Decompressors, 199
— Sidecar from Burma, A, 393
— Throttle Control Stop, A (illus.), 470
Home-produced Fuel, 143, 213, 366
— — To Exploit, 100
Homes on the Hillsides, The, 289
Hopkinson, Bertram, Maj., 217
Horizontal Equivalent, 264
— Rotary Engines, 94
— Twin, The Raleigh, 280
Hospital for Damaged Aeroplanes in France (illus.), 305
Hot Air Device, Fitting a, 532
Houlding, Bert (letters), 292, 487
House Removal, Petrol for, 134
How Aero Engines are Started, 390
— Capt. (illus.), 524
— is it done? 199, 248
— Many Speeds? 554
— not to Invent, 17
— the Germans Generate Electricity for Wireless in the Trenches (illus.), 303
— to Engine a Big Bomber, 168
— — Find the c.c., 556
— — — — Centre, 112
— — Start Easily, 532
Howard Cuff Valve, The (illus.), 138
H. Owitzer (letter), 59
Hub and Countershaft Gears, 395
— Gear, Adjusting a, 227
— — Alterations, 134
— — Fitting a, 110
— — Repairs, 378
— Gears, 156
— — Again, 110
— Lubricant, 556
Hubbard, T. (letter), 199
Hucks, B. C., The Late Capt., 431
Hudson, W. E. (letter), 248
Humber Flat Twin and Sidecar, A 6 h.p. Water-cooled (illus.), 323
— — — Two Thousand Miles on a, 323
— Rear Braking System, The (illus.), 320
— Recreation Society, The, 564
— Water-cooled Engine, The 3½ h.p. (illus.), 299
— — Motor Cycle, The 6 h.p. (illus.), 298
— — 6 h.p. Flat Twin (illus.), 62
Humphries and Dawes, 378
Humphreys, W. E., Chief Mechanic, 563
Hun Aero Engines, 407
— Aeroplane Wastage, 262
Huns, Petrol for, 77
— Post-war Trade and the, 484
Hunter, E. Kenneth (letter), 510
H.W.S. (letter), 357
Hydrogen from Water, 22

I

Ideal, A Colonial Post-war, 392
— Motor Cycle, An, 417
— — — My, 367, 572
Ideas, Useful and Ingenious, 26, 112, 180, 318, 470
Ignition Apparatus, 204
— Dynamo Lighting and, 62
— Timing, Two-stroke, 420
Illumination Number Plate, 48
Imperial Cycles, Ltd., 90
— Memorial Scheme, An, 488
Imperially, Think, 530
Imp Motor-assisted Cycle, The (illus.), 140
Importance of being in Earnest, 62
— — Price, The, 483
Imports and Exports, 78, 280, 366, 470, 544
Impressions, 308, 498
Improved Sidecar Connection, 90
— Silencer, 204
— Tank, An, 63
Improvement, A Needed, 233
Improvements in Aviation, Post-war, 527
Improving Old Models, 89
Incidence, Angle of, 264
Inclinometer, 264
In Clover, 224, 267, 336
— Favour of Lightweights, 23, 42
— 1923, 61
— the Country of the Canyons, 206
Incomplete Data, 134
Increasing the British Export Trade, 190
India, A Thousand Mile Ride in, 159
Indian and Sidecar alter being Hit with a Shell (illus.), 429
— Editors on Western Front (illus.), 390
— Spring Fork (illus.), 115
— — Frame, The (illus.), 410
— The 1919, 385
Indians in the U.S. Service, 521
Induction Joints, Aero Engine, 273
— Pipe, Cooling the, 207
— — Design, 128
— — Heating, 26
Industrial Reconstruction Council, The, 8, 77, 189, 213, 257, 304, 325, 346, 366, 405, 501
Industry, The Politics of the Motor Cycle (leader), 91
Inertia, Moments of, 409
Inflated, An Old Market (leader), 359, 463
Inflator, An All-steel, 468
Influence of Aircraft Engine Design, The, 385, 386
Ingenious Cycle Car, An, 221
— Kick-starter, An, 334
Inglis Ker, J., 257
Injector, A Spring-operated Petrol and Oil, 318
Innocent Misrepresentation, 420
Instability, 264
Institute, The Aeronautical, 406
Institution of Automobile Engineers, 478
Integral Gear Box, A Flat Twin with, 362
Intelligence, Local Authority, 2
Interchangeable Wheel, Detachable and, 90
Interested (letter), 437
Interesting Carburetter Design, An, 151
— Competition, An, 269
Internal Combustion Turbines, 42, 57, 105
— — — and Rotary Engines, Some, 4
Internals or Externals? 162
International Aero Exhibitions, 503
Invasion, Training for, 45
Invent, How not to, 17
Inventions, Aeronautical, 65
Inverted Piston, An Engine with, 119
Inward Side-slip, Checking, 328
Italian Aeroplanes and Aeroplane Workers (illus.), 431
— Ally, A New Product by, 76
— Sailors bringing in a Large Aeroplane (illus.), 479
Ixion and Three-wheelers, 581

J

J.A.C. (letter), 438
Jackson Three-wheeler, The (illus.), 241
Jacks, Pte., R.F.C. (illus.), 10
Jacobs, W. A., 172
Jacobns (letter), 86
Jacquot, R. A., Lt., R.A.F. (illus.), 144
James Patent Sidecar Windscreen (illus.), 117
— Sidecar Twin, 90
Japanese Motor Cycle Police, 346
— Scenes (illus.), 566
Japan, The Motor Cycle in, 144
J.A.P. Four-cylinder Motor Cycle, The (illus.), 102
— Timing Pinion, Removing a, 89
Jaugard Spring Frame, The (illus.), 410
J.C.P., R.A.F. (letter), 314
Jefferys, B. (letter), 247
— Bryan (illus.), 573
Jennings, J. T. (letter), 155
Jerusalem, Cairo to, 45
J.G.L., Pte. (letter), 172
Job, The Bomb-dropper's, 370
— — Rigger's, 307
Johnson, Cpl. (illus.), 59
— Motor Wheel (illus.), 69
Joining the Motor Boat Patrol, 48
Jones, G. R. (letter), 488
— Leonard (letter), 355
Joynson-Hicks, Mr., 69
Judging Flying Speed, 329
— Speed by Observing Landmarks, 148
Jungle, Despatch Riders of the, 46
Justification of Optimism (leader), 421

K

Keeping of Motor Cycles, The (leader), 295
Keller, Roderick Leopold, Capt., R.A.F., The Late, 193, 212
Kempson-Jones, S., 478, 555
Kent, Stephenson, Sir, Demobilisation Department, 431
Kessell, Cpl. (illus.), 59
Kettle, T. (letter), 42
Keys, R. E., Lt., D.C.F., 305
Kick-starter, An Ingenious, 334
— The Bradbury, 551
Killian, J. M., Sgt., 191
Kinnear, Albert M., Sec.-Lt., R.F.C., 79
Kinnison, Clive, Capt., 101
Kites, The Man with the, 82
Kiwi (letter), 293
K.L.G. Plugs, 416
Knocking, 250
— A Cause of, 84
— after Overhaul, 24
— and Tapping, Konking, 430
— War Petrol and, 462, 511
Knod, C., Pte., 191
Konking, Knocking, and Tapping, 430

L

Lady Motor Cyclist and her Mount, The, 424
— — Cyclists of the A.S.C on Armistice Day (illus.), 501
Lamp Bracket, A Loose, 423
Lamplugh Pump in its Latest Form, The, 384
— S. A., 378
Landing in a Cornfield, 121, 167, 169, 225
Landings, Night, 388
Landmarks, Judging Speed by Observing, 148
Langley, M., Pte., D.R., R.E. (illus.), 520
Laurin and Klement Four-cylinder Motor Cycle (illus.), 102
Layzell, S. J. (letter), 314
Leaderettes, 1, 25, 49, 71, 91, 111, 131, 157, 179, 205, 229, 251, 271, 295, 317, 339, 359, 379, 399, 421, 443, 469, 491, 509, 533, 557
Leakage of Magnetism, 42, 291, 356, 509, 531, 555
Leak or No Leak (letter), 555
Leaky Valve Caps, 89
Leave from Ireland, 227
— Petrol for Soldiers on, 84, 109, 128, 154, 174, 201
Leckie, R., Capt., D.S.O., D.F.M., 305
Lectures, Aeronautical, 479
Leechman, Douglas (letters), 438, 487, 578
Lee-Guinness-Smith Motor Attachment, The (illus.), 296
Legal Query, A, 398
Le Grand, J. P., 172
Les as Points par Eux-memes, 548
Letters of Capt. Ball, V.C., 246
— to the Editor, 21, 42, 66, 84, 108, 126, 153, 174, 199, 224, 247, 267, 291, 313, 335, 355, 375, 394, 417, 462, 437, 487, 509, 529, 554, 577
Levis Engine Unit (illus.), 32
— Flat Twin, The (illus.), 60
— Lightweight Model with Side-by-side Seats (illus.), 310
— Post-war Twin, The, 32
— Side-by-side Two-stroke Twin Engine (illus.), 7
— Two-stroke Model for Ladies (illus.), 425
Levisette 1913 Model (illus.), 211
Lewis, P. A., Capt., R.E. (letter), 199
Liberty Engine, The, 63
— Motor Cycle, The, 120
Licence Rebate, 316
— The Local Taxation, 358
Licences and Permits, 420
Lt. R.A.F. (letter), 175
Lighter Lightweights, 208
Lighting and Coil Ignition, Dynamo, 62
— Electric, 85
— from the Magneto, 333
— Magneto Lamp, 358
— Order, New, 564
— Set, Simplifying the Dynamo, 234
Lightweight for 1919, The Cleveland, 551
— Mounts, Typical (illus.), 425
— Record, New, 333
— that is not a Toy, A, 567
— Two-stroke, A, 24
— Used during Removal, A Royal Ruby, 386
Lightweights, In Favour of, 23, 42
— Lighter, 208
Limit of Resistance, 65
Lindsay, A., Capt., R.A.F. (Medical), 85
Lisle Watson, Capt., 406
L.M.C. Rear Braking System, The (illus.), 320
Loading 409

Local Authority Intelligence, 2
— Taxation Licence, The, 358
London-Paris Air Service, A, 455
— to Exeter Trial Scenes (illus.), 536
Longstaff, W. J. (letter), 509
Long-stroke Engines, 20, 85, 201
Longton, Walter Hunt, Lt., 546
— W. H., Flight-Comdr. (illus.), 520
Looking Ahead, 400, 437
Look to Your Bolts (letter), 462
Loose Lamp Bracket, A, 423
Loot, 2nd (letter), 291
Loss of Compression, 338
— — Power, 490
Lost on Rail, 512
Loughborough, T. W. (illus.), 458
— — — Director A.C.U., M.M.D. (letters), 66, 508, 524
Low, A. M., Maj., R.A.F., 188
Lowenhardt, Lt., 167
£ s. d. of Flight, The, 433
Lubricant, Hub, 556
Lubricating the Gear Box, 242
Lubrication, 249
— and Friction, 258
— Chain, 467
— Engine, 468
— Gear Box, 48
— The Need for, 31
— Throttle Control, 384
Luxury Tax and Motor Vehicles, 165
— — Here and There with the, 285
— — on Motor Vehicles, The, 313
— — The (leader), 135
Lynch Blosse, C. E. (letter), 22

M

M.A. (letter), 336
Machine, Capabilities of a, 178
— Choosing a, 467
— for Disabled Rider, 227
— Gun Batteries in France, Motor, 166
— Hiring a, 203
— Purchasing a New, 377
— The All-fuel, 482
— — German D.R.'s, 172
Machines, A Suggestion, War-worn, 461
— British, 560
— — and American, 126, 225, 268, 292, 336, 376, 418
— Cost of Post-war, 50
— for Disabled Riders, 227, 247
— in the French Army, British, 214
— The Renovation of Second-hand, 237
Maconber Rotary Engine (illus.), 94
Macpherson, Mr., 404
Madge D. (letter), 376
Magnetism, Leakage of, 42, 291, 356, 509, 531, 555
Magneto, Altering a, 338
— Choosing the Type of, 183
— Conversion, 358
— Cut-out, A Neat, 26
— Design, 23
— Electric Lighting from a Converted, 33
— Incorporating Impulse Starter (illus.), 117
— Lamp Lighting, 358
— Lighting from the, 333
— Manufacture, Testing in, 345
— Puzzle, A, 512
— Remagnetising a, 398
— Timing, 442
Magnetos, British, 248, 335, 366
Magnet, The Way of a, 228
— Three-seated Sidecar, The (illus.), 255
Mail, The Aerial, 349
Maimed, Motor Cycling for the, 511
— Soldiers, Of Interest to, 90
Maitland, H. M., Capt., 520
Major R.G.A. (letter), 417
Malon, Tom, The Late, 501
Mander, T. J., Sec.-Lt., The Late, 521
Manifold, H. C., Sgt. (letter), 394
Mannock, Ed., Capt., R.A.F., 281
Manœuvrability, Speed *v.*, 409
Manual for Motor Cyclists, A Useful, 152
Manufacture, Date of, 467
Manufacturer's Appeal, A, 462
Manufacturers Freed, 545
Man with the Kites, The, 82
Maps, War-time Michelin, 56
Marchant, W. D. (letter), 488
Marians, B. (letter), 462
Market, An Old Inflated, 359, 463
Marston, Ltd., John, 468
Massenia, John (letter), 126
Matchless Flat Twin Frame, The (illus.), 410
— — — The (illus.), 61
— Military Model Outfit (illus.), 96
— Three-wheeler, The (illus.), 240
— Twin fitted with Lucas Dynamo, 8 h.p. (illus.), 235
Material, Economising, 354
Mathieson, Geo. W. (letters), 187, 484
Matters, Urgent, 469
Mauduit, Ronald F. S., Lt., R.F.C., 79
Mayne, R. F. (letter), 487
McCudden, J. T. Byford, The Late Maj., V.C., D.S.O., M.C., M.M., 63
McElroy, G. E. H., Lt. (Temp.-Capt.), M.C., D.F.C., 327
McGowan, C. J., Motor Cyclist Sgt., R.E., 223
McKernan, Frank, 555
McLeod, R. G., Lt. (letter), 66
— Thos. (letter), 175
McNab, F. A., Lt., R.N.V.R. (illus.), 214, 404
Measuring Energy, 54
Meccano Cycle Car, The, 113
Mercèdès Engine, A 260 h.p. (illus.), 481
Mechanical Engine Starters, 187
— Pump, Drip Feed *v.*, 478
Mechanicus (letters), 200, 395
Mechanism, Timing, 36
Macready, Eric, Capt., 223
Meet, A Proposed, 454
Memorial Scheme, An Imperial, 488
Mending Belt in Cold Weather, 470
Merchant Service, Petrol for the, 153
Meriden Cross (illus.), 522
Merkel Motor Assisted Cycle (illus.), 141
Mesopotamia, In (illus.), 93
— Snapshots from (illus.), 172
Message of Peace, The (leader), 443
Method of Cooling, A Suggested, 269
Mica Sparking Plugs, 487
Michelin Maps, War-time, 56
Mid-air, Stopping a Petrol Leak in, 261
Middlesex Volunteers Explore Surrey, 215
— — in Action (illus.), 45
Midget Bicar, The (illus.), 424
Midland Winter Trial, The Start of a, 538
Militaire Bicar (illus.), 98
— — The American (illus.), 97
— Engine and Friction Set (illus.), 274
— Four-cylinder Motor Cycle, The American (illus.), 103
Military Motor Cycle Test, A, 353
— Notes, 10, 59, 101, 118, 172, 191, 223, 309, 331, 374, 404, 520
Militor Combination, The (illus.), 353
Millford Tandem-seated Sidecar Model (illus.), 255
Mills, H. C., Capt., R.A.F. (letter), 118
— J. Q. (letter), 225
Minerva, 178
Ministry of Munitions Permits, 449
Misfiring, D.R.'s Danger and Curious Cause of, 10
Misrepresentation, 156
— Innocent, 420
Missin, Sam (letter), 154
Mitchell, L. G. (letter), 175
Mixed Turbine as a Motor Cycle Power Unit, The, 352, 356, 418
Mixing an Engine, 24
Mixture, Too Strong a, 270
M-L Magneto Syndicate, Ltd., 90
Models, New American, 351
— 1919, 554
— Peace, 450
Model, The Peace, 413
Modern Types of Seaplane, 372
Moffet, J. Wallace, Sec.-Lt., A.S.C., M.T. (letter), 437
Mohandis (letter), 128
Monks, H. H. (illus.), 213
Monopoly, No Question of, 392
Mons Ribbon (letter), 394
Monte Some More (letter), 462
Moore, J. J. (letter), 579
— — — Second London Section, N.M.C.F.U. (letter), 248
Morane, Leon, The Late, 387
More Notes on Alcohol, 75
— Peace Programmes, 472
Morgan Going Well, A (illus.), 215
— H. George (letters), 394, 487
— Runabout, The, 53
— Three-wheeler, The (illus.), 240
Morgans near the Devil's Elbow, I.O.M. (illus.), 272
Motion Study and the Motor Cycle, 68, 128
Motor Bicycle, Storing a, 358
— — The Standardised (leader), 379
— Boat Patrol, Joining the, 48
— Club, The York and District, 577
— Cycle, A Ford, 391
— — and the Fuel Crisis, The (leader), 251
— — An Electrical, 316
— — — Ideal, 417
— — Boom, Greeting the New, 452
— — Club News, 507
— — Engines, Aero Plugs in, 51
— — — Four-cylinder, 127
— — — Torque in, 301
— — for Business, A, 294
— — in India, The, 22
— — — Japan, The, 144
— — Industry, The Politics of the (leader), 91
— — Motion Study and the, 68, 128
— — My Ideal, 367, 572
— — on the Farm, The (illus.), 55
— — or Train, 171
— — Passing French Transport on Menin Road (illus.), 391
— — Popular Prejudices against the, 230
— — Power, The Mixed Turbine as a, 352, 356, 418
— — Repair Shop at back of American Line (illus.), 225
— — Schools (leader), 317
— — Stolen, 188
— — Streamlining a (leader), 229, 314, 418
— — Supply in the U.S.A., 386
— — Test, A Military, 353
— — The A.B.C., 541
— — — Economical, 415
— — — Friction-driven, 274
— — — Liberty, 120
— — — Water-cooled, 297
— — Why not a Petrol-electric, 435
— Cycles and Aeroplane Construction, 255
— — — Aeroplanes, 327
— — — Automobile Engineers (leader), 339
Motor Cycles, British *v.* American, 200
— — Date of Second-hand, 85
— — Disabled Men and the Control of, 573
— — for Colonial Use, 394
— — — the Disabled, 130
— — Four-cylinder, 102, 200
— — in Calcutta, 186
— — — India, 78
— — Petrol Consumption of U.S., 142
— — Sale of Army, 462
— — Second-hand, 540
— — Steam, 153, 201, 510, 529
— — The Keeping of (leader), 295
— — U.S.A. Tax on, 34
— — with Spring Frames, 410, 437
— Cycling Club's Activities, The, 563
— — for the Maimed, 511
— — in the Far North, 44
— Cyclist Ambulance Drivers Wanted, 189
— — and her Mount, The Lady, 424
— — Despatch Riders, An Army of (illus.), 544
— Cyclists, Airmen, 145
— — and the Election, 496
— — — — R.A.F., 44, 68, 154, 176, 314
— — A Useful Manual for, 152
— — Checking Out of the Works at Lunch Interval (illus.), 416
— — Filling up Recruiting Forms in 1914 (illus.), 487
— — in Winter Garb (illus.), 453
— — The Training of A.S.C., 279
— — Wanted, 304
— — Workshop and its Equipment, The, 542
— Journals, Technical, 326
— Machine-gun Batteries in France, 166
— Machine Guns in France (illus.), 57, 166
— Market in Australasia, The, 276
— Schools, The A.A. and, 214
— Spirit, Prices of, 35
— Trade Travellers' Association, Proposed, 68-84, 128
— Traction Publishing Co. (letter), 43
— Transport Volunteers, 238
— Tuition, Unsatisfactory, 275
— Users' Protection Association, 9
— Vehicles, Coal Gas for, 545
— — The Luxury Tax and, 165
— — — — on, 313
Motorised Bicycles, Two More, 296
— Bicycle, The, 140
Motorist (letter), 529
Motorists' Black List, A, 24
— Successful Appeal, A, 386
— Traffic Rules for, 258
Motosacoche Engine Set fitted to Cycle (illus.), 141
Mount, An Executive Officer's, 109
— A Suitable, 437, 462
— The Lady Motor Cyclist and her, 424
M.S. (letter), 509
M.T. Subaltern (letter), 530
Mudguarding, 187
— and Petrol Economy, 68
Mudguards, 164, 180
Mudshields, 420
Mule, The (letter), 248
Multiple Engines, 12
Munitioners, No Holiday Petrol except for, 116
Munition Workers, Petrol for, 78, 156, 178, 248
Musgrave Hoyle, W., Capt. (letter), 531
Myers, G. (letter), 395
My Ideal Motor Cycle, 572

N

Nadaud, Marcel, 389
National Cycles, 325
— Motor Cyclists' Fuel Union, The, 405, 507
Naval Aircraft Wonders, 547
— Friend, Petrol for a, 89
Neat Magneto Cut-out, 26
Needed Improvement, A, 233
Need for Lubrication, 31
— — Reform (leader), 513
Nelson, A. N., Cpl. (letter), 85
New American Models, 351
— Brough Model, The, 562
— Earles Shipbuilding Co., Employees of the (illus.), 35
— Engine, A, 217
— German Aeroplane Bombs, 369
— Hudson Outfits in South Africa (illus.), 561
— Imperial Cycles, Ltd., 378
— — Machines for U.S.A. Army, 393
— Lighting Order, 564
— Machine, Petrol and a, 249
— — Purchasing a, 377
— Model Schebler Carburetter, A, 551
— Product by our Italian Ally, A, 76
— Rotary Valve, A, 222
— Spring Fork Designs, Three, 278
— Two-stroke, Road Test of a, 354
— Zealand, Racing in (illus.), 202
— — Trade, 186
Newlands, the Highwayman's Resort (illus.), 416
Newman, F. H. W. (illus.), 510
Night Bombing Raids, About, 218
— Landings, 388
1918 Harley-Davidson, The, 175
1919 Excelsiors, 574
— Models, 554
— The Competitions of (leader), 491
1923, In, 59
Nipple for Bowden Wire, 112
Nobel Rover, 191
No Holiday Petrol except for Munitioners 116
Non-detachable (letter), 355
Non-flam. Aeroplane, Wanted, 284

Non-rusting Toolproof Finish, A, 543
— — — Wanted a, 319, 355, 462, 554
Non-techniques (letter), 154
North Africa to Asia by Aeroplane, 525
— British Rubber Co., 90
— Motor Cycling in the Far, 44
Norton Engines, The Timing of the, 33
— Jas. L. (letter), 313
— Motors, Ltd. (letter), 267
— Quad, The, 100
— Queries, Some, 556
Nose Dive, The First Spiral, 199, 224
— — The Spinning, 261
Notes on Alcohol, More, 75
— Carburetter Design, 352
— Clutches, 427
— Flat Twin Engines, Some, 558
— the French Tanks, Some, 296
— Some Casual, 72
Not 10,000 Aeroplanes in all the Air Armies, 169
Not yet an Aviator (letter), 314
Novel Sidecar Screen, 117
N.S.U. Gear, Free Engine with, 316
— Motor-assisted Cycle (illus.), 142
— Spring Frame, The (illus.), 410
Number Plate Illumination, 48
Numbers on Commercial Vehicles, Motor, 303
N.U.T. Motor Cycle with Lady Rider, The 5-6 h.p. Overhead Valve, 553
Nuts and Threads, 21, 67
Nuttall, Frank, Capt., R.A.F., 217

O

Observation, Tangents of, 217, 268, 314, 336, 418
Occasional Comments, 3, 27, 51, 73, 92, 113, 137, 158, 181, 207, 231, 253, 273, 297, 319, 340, 361, 381, 401, 423, 444, 471, 493, 515, 535, 559
Off for a Breath of Sea Air (illus.), 171
Officer in India, An (letter), 483
Officer's Mount, An Executive, 109
— Pay, Army, 404
O.H. Water-cooled Bat-Jap Engine, An (illus.), 298
Oil Atomiser, A Heavy, 258
Oil from Hemp Seed, 100
— Pump, A Throttle-controlled Force Feed, 441
Oiling Flat Twins, 180
— in Rear Cylinder, Over, 110
Oilless Bearings, 258
Okay Motor-assisted Cycle, The (illus.), 140
O.K., The Post-war, 378
Old Days, Autumn in the, 549
— Engine, Timing an, 398
— Market Inflated, An, 359, 463
— Models, Improving, 89
— Reader (letter), 291
— Sporting Days, The (illus.), 360
Olympia, 465
— Exhibits from the Gallery (illus.), 465
One-armed Motor Cyclist (letter), 394
One, Four Cylinders in, 439
— Hundred Guinea Cycle Car, The A.B.C., 502, 554
— Lever Carburetters, 1, 53, 66, 84, 115, 119, 226, 292, 293, 336, 356, 395
— of the Boys under the Red Ensign (letter), 153
— — — Duds (letter), 376
— — — Old 'Uns (letter), 226
— Way of Getting Petrol, 280
— who has Served (letter), 267
On the Tokaido, 565
Opinions of Post-war Flight, 455
Optimism, The Justification of, 421
Orde, M. A. J., Lt. (illus.), 145
Osborne Spring Fork Device, The (illus.), 278
Overhaul, Knocking after, 24
— Starting after an, 250
Overhead Valves, 180
Overheating, 178, 270
— What is, 186
Overloaded Passenger Machines, 174
Overloading (leader), 179
Over-oiling in Rear Cylinder, 110
Overseas Flying, Cross Country and, 244
— Section, 83, 185, 276, 391, 482, 560
Over the Hills and Back Again, 343, 347
Owitzer, H., Sgt. (letter), 59

P

Pacer Model with J.E.S. Engine (illus.), 211
Paille (letter), 418
Palmer, A. J., Temp.-Maj., 191
P. and M. (letter), 174
— — — Band Brake, The (illus.), 321
— — 90° Twin (illus.), 60
Parachute, The Problem of the, 348
Paraffin, Petrol and, 47
— Running on, 70, 178
— Using, 89
Paragon Water-cooled Single Two-stroke Engine, The 4 h.p. (illus.), 299
Parkinson, W. (letter), 269
Parrot Mascot of R.A.F. Fighting Squadron (illus.), 107
Passenger Machines, Overloaded, 174
— Machine, The Single-track, 310
— Record, 479
Patches, Carrying, 419
Patents, 90, 204, 408
— Some American, 234
Patteson, Cyril, Maj., R.A.F., 503
Patterson, David (letter and illus.), 109
— Matt (letter), 530
Pay, Army Officers', 404
Payne, W., Cpl. (letter), 172
Peaceful Potterer, A Simple and Inexpensive Motor Cycle for the, 313
Peace Model Programmes, 450, 472, 524
— Model Sidecar, A, 497
— The, 413
— Models, 450
— Programme, The A.C.U. and its, 458
— The Message of (leader), 443
— What of the Future? 446
Peak District, A Scene in the (illus.), 344
Pedley and Son, J., 204
— W. M., Capt., 101
Pegoud, André, 243
Pellat, L., Lt., 59, 101
Percival White Super Cycle, The (illus.), 97
Percy, J. C., Lt., R.N.V.R., 325
Permits, Licences and, 430
— Ministry of Munitions, 449
Peronne, J. E., A.M.I.E.E. (letter), 186
Perrins, W. P., Sapper (letter), 10
Persia, The A.S.C., M.T., in, 223
Petroil System, The, 294
Petrol and a New Machine, 249
— — Knocking, War, 462
— Oil Injector, A Spring-operated, 318
— Paraffin, 47
— Consumption, 21
— — of U.S. Motor Cycles, 142
— Controller's Department, The (leader), 295
— Crimes and Comments, 87
— — except for Munitioneers, No Holiday, 116
— Economy, 364
— — Mudguarding, 68
— — for —? 335
— — a Naval Friend, 89
— — Christmas, 529
— — Disabled Soldiers, 405
— — Discharged Soldiers, 174, 226, 267, 291, 336, 355, 428
— — — — and Sailors, 477, 500, 501
— — France, 257
— — Holiday Makers, 174
— — House Removal, 134
— — Huns, 77
— — Munition Workers, 78, 156, 178, 248
— — a O.M.A.A.C. Driver, 429
— — Sailors, 510
— — Soldiers and Sailors on Leave, 10
— — — Others (leader), 157
— — — on Leave, 84, 109, 128, 154, 174, 201, 248, 291
— — Teaching Driving, 203
— — the Merchant Service? 153
— — Whom? 144
— — Workers, 126
— Holiday, 173
— Leak in Mid-air, Stopping a, 261
— One Way of Getting, 280
— Permits, 532
— Restrictions, 511
— — Further Concession, 477, 511
— Rumour, The (leader), 71
— Soon, 449
— Squirt, Carrying, 318
— Surveyor Wants, 228
— Tank, Emptying, 470
— The Use of, 24, 110, 203
Petrol-electric Motor Cycle? Why not a, 435
Petroleum Research, 314
Pfalz Aeroplane, A German Production (illus.), 13
— Single-seater, The, 261
Phelon and Moore, Ltd. (letter), 462
— — — Sidecar Machines as used by the R.A.F. (illus.), 233
Phillips, C. P., Sgt. (letter), 68
Philpott, J. M., Rev. (letter), 463
Pierce Four-cylinder Motor Cycle, The (illus.), 104
— Motor Cycle with Shaft Transmission, The, 494
Pigeons, Messenger, in France (illus.), 38
Pillion Riding, 338, 577
— Seats, Some Remarks on, 310
Pilot's Engine, A, 480
— Mascot, The, 217
— Plans for their Future Careers, French, 546
Pilot, Training a (illus.), 457
Pipe from Generator to Sidecar Lamp, 318
— Heating Induction, 26
Piston, An Engine with an Inverted, 119
— Ring, An Ingenious Double (illus.), 33
— Rings, Breaking, 338
— The Ricardo Crosshead, 396
Pitt, Wm. (letter), 43
'Planes, Decorating the, 81
— The Guns of Fighting, 146
'Plane Tales from the Skies, 330
Planter (letter), 392
Plugs, 355
— Cleaning, 509
— K.L.G., 416
— Protecting the, 65
"Poilu, The Flying," Reviewed by Torque, 389
Pointed Question, A, 42, 66, 85
Points, Fewer (leader), 157
Politics of the Motor Cycle Industry (leader), 91
Pope Springing Arrangement, The (illus.), 411
Popular Prejudices against the Motor Cycle, 230
Porte, F. (letter), 174
— John C., 79
Position for the Clutch, The Best, 256, 357
— of the Sidecar Body, The, 519, 578
Post-war Clyno, A Run on the, 486
— The, 453
— Competitions, 214
— Flight, Opinions of, 455
— Ideal, A Colonial, 392
— Improvements in Aviation, 527
— Machines, Cost of, 50
— Policy of the Shell Co., 278
— Programme, The A.B.C., 475
— Roads, 238
— Supplies and Demand, 322
— Trade and the Huns, 484
— Twin, The Levis, 32
Pott, G. (letter), 23
Power and Resistance, 64, 80, 106
— Unit, The Mixed Turbine as a Motor Cycle, 252, 356, 418
— Loss of, 490
— Revs. and, 7
— The Units of Capacity and, 55
Praise of the V Twin, In, 176
Pratt, Billy, Cpl., 59
— Douglas, Maj., 101
Preen, Clive (illus.), 212
Pre-ignition, 270, 582
Pre-war Days, Christmas Trials of, 536
— Enthusiast, A (letter), 226
— Winter Trials, Reminiscences of (illus.), 534
Prejudices against the Motor Cycle, Popular, 230
Premier Car type Expanding Brakes, The 1915 (illus.), 321
— Lady's Model, A 3½ h.p., 424
— Runabout, The, 523
— Three-wheeler, A, 385
Press Tour, Journalists in Handley Page Aeroplane, Allied (illus.), 330
Pressure and Quantity, 55
— — Vibration, Explosion, 108, 154
Prices, 530
— of Motor Spirit, 35
Price, 578
— The Importance of, 483
Pritchard, Henry, Cpl., R.E., 511
Problem of the Parachute, The, 348
— — — Roads, The, 473
Problems of Reconstruction, 501
Procrastination as an Aid to Profiteering (leader), 25
Producing the Props, 284
Product by our Italian Ally, A New, 76
Products, British Scientific, 171
Profiteering, Procrastination as an Aid to (leader), 25
Programme, The A.B.C. Post-war, 475
— — A.C.U. and its Peace, 458
Programmes, Peace Model, 450, 472, 524
Pro Patria, 149, 197, 289, 575
Propeller Boss, An Engine within the, 14
Propellers, 193
— for German Aeroplanes, Making (illus.), 284
Proposed Meet, A, 454
— Motor Trade Travellers' Association, 68, 84, 128
Props, Aero, 105
— Producing the, 284
Protecting the Plugs, 85
Protractor for Engine Timing, 112
Psychology of a British Ace, The, 123
Public, Competitions and the, 459
Pulley Flange Repair, A Broken, 375
— Removing a, 250, 294
Pulpit Rock, Bains Kloof, South Africa (illus.), 561
Puncture-preventing Device, 212
Purchasing a New Machine, 377
Purdie, Sapper (illus.), 46
P.V. Spring Frame, The (illus.), 410

Q

Quad (letter), 126
Quads, The Early, 126, 181
Quantity, Pressure and, 55
Q.M.A.A.C. Driver, Petrol for a, 429
Queries, Some Norton, 556
— Some Valve, 270
Query, A Chemical, 490
Question, A Pointed, 42, 66, 85
— of Streamline, The, 380
Questions and Replies, 24, 48, 70, 89, 110, 134, 156, 178, 203, 227, 249, 270, 294, 316, 338, 358, 377, 398, 418, 442, 467, 490, 512, 532, 556, 582
— re an Old Engine, 227

R

Racing in New Zealand (illus.), 202
— Wheel, A 540 m.p.h., 16
Radial Engines, 579
Radium Substitute, 387
R.A.F. Aeroplane in France (illus.), 243
— Despatch Rider in Palestine, An (illus.), 331
— — — The Adventures of an, 223
— Exhibition, 431
— — The, 481
— Extension of Service, 525
— Fighting Plane, An (illus.), 169
— Flying Boat in Lord Mayor's Show (illus.), 455
— Joining the, 238
— Lady Motor Cyclists with P. and M. Sidecar (illus.), 464
— Men at Work on Wrecked German Aeroplane (illus.), 349

R.A.F., Motor Cyclists and the, 44, 68, 154, 176, 314
— Officers' Uniforms, 525
— Pilots and Machine on Western Front (illus.), 170
— Prisoners of War Fund, 431
— Reception Depot, A Visit to an, 50
— Recruits, Training for, 79
— Scouts on Western Front, A Squadron of (illus.), 387
— Technical and Administrative Commissions in the, 387
— Transfer of Officers to, 167
— Uniforms, Another Order, 387
— Uniform, The New, 105, 167, 188, 305
R.A.F.'s Record, 455
Raiders, Fleet of Ten Thousand, 122
Raids, About Night Bombing, 218
Raikes, Capt. David, 101
Raleigh Flat Twin (illus.), 60
— Horizontal Twin, The, 280
— Shaft Drive, A (illus.), 419
— Spring Frame, The Latest (illus.), 411
Rally Sidecars, 500
R.C.H. (letter), 21
Readers' Replies, 270, 291, 490
Reading Standard for 1919, The, 422
— — Spring Fork (illus.), 115
Real Cycle Car, The, 2
— Engineer, The, 76
Rebate Licence, 316
Rebound Spring for Triumph Forks, 26
Rebushing, Hints on, 182
Recent Designs in Spring Frames, 52
Recommended Routes, 24, 48, 70, 89, 110, 134, 156, 178, 203, 227, 250, 270, 294, 316, 338, 358, 377, 398, 418, 442, 467, 490, 512, 532, 556, 582
Reconstruction Council, The Industrial, 8, 77
— Lectures, 429
— Problems of, 561
Record Month's Bombing, A, 369
— New Lightweight, 333
— Passenger, 479
— Speeds, 48
— The Duration, 247
Red Air Fighter, 261
Reece, James (letter), 226
Reed, G. A. (Hon. Sec., York and District M.C.) (letter), 577
Referendum, Notes on the, 524
Reform, Need for (leader), 513
Regent's Park M.C.C., To Members of the, 564
Registration Query, 358
Regular Despatch Rider of the A.C.U., M.M.D., A, 66
Release of Benzole, 521
— Valve, Compression, 204, 224
Reliability, 560
Remagnetising a Magneto, 398
Reminiscences of Pre-war Winter Trials (illus.), 534
— Some, 514
Removal, A Royal Ruby used for (illus.), 386
Removing a Ball Bearing, 249
— — J.A.P. Timing Pinion, 89
— — Pulley, 250, 294
— Enamel, 144
— Screws, 180
— the Gudgeon Pin, 377
Remy Generator, Circuit Breaker Side of the (illus.), 234
Renovating a Wicker Body, 532
Renovation of Second-hand Machines, The, 237
— Sidecar, 212
Repair, A Broken Pulley Flange, 375
Repairs, 44
— Hub Gear, 378
Research, Petroleum, 314
Resistance, Power and, 64, 80, 106
Restrictions on Export Trade (leader), 557
— Petrol, 511
Retrospection, 217
Reverse, Five Speeds and, 133
Revs. and Power, 7
Rex Shaft-driven Motor Cycle (illus.), 61
— V Twin Motor Cycle Showing Transmission (illus.), 495
Reynolds, T. F. E., Cpl., 191
R.G.C. (R.F.C. (letter), 21
Rheumatism, Guarding against, 266
Ricardo Crosshead Piston, The, 396
Richards, R. W., Lt. (letter), 23
Richthofen's Death, 175
— Diary, 44, 66, 86, 109, 155, 193
Rif-Raf (letter), 175
Rigden, J., Capt., R.G.A. (illus.), 405
Rigger's Job, The, 307
Rim Sizes, Tyres and, 228
R.J.S. (letter), 355
R.N. (letters), 417, 464, 511, 555, 578
R.N.A.S., Boys of the Old, 217
Road Conditions, 68, 108
— Racing in South Australia, 33
— Requiring Reconstruction (illus.), 473
— Test of a New Two-stroke, 354
Roads after the War, French, 202
— French, 199
— in Australia, Good, 187
— — War, 568
— The Problem of the, 473
Robbins, A. C. (letter), 582
Roberts, C. O., R.A.F., The Late, 193
— Howard, Capt. (letter), 510
Robertson Three-wheeled Cycle Car, The 8 h.p. (illus.), 357
Robie Cycle Car, The (illus.), 75
Robinson, Leefe, Capt., V.C., 569
— R., Sec.-Lt. (letter), 23
Roe, C. (letter), 337
Roemmele, W., Capt. (letter), 313
Rogan Weatherproof Coat, The (illus.), 383
Rogers, William W., Capt., R.F.C., 79
Rollason's Six-stroke Scavenging Engine (illus.), 402
Rollo Cycle Car, The English (illus.), 75
Room Five Miles High, A, 263
Rotary Engine Design, A, 236, 335
— Engines, 335
— — Horizontal, 94
— — Some Internal Combustion Turbines and, 4
— Valve, A New, 222
Rover Pedal Cycle with Neat Transmission (illus.), 495
— Rear Brake, The Latest (illus.), 320
Royal Air Force Club, The, 406
— Canadian Air Service, 305
— Ruby Motor Cycle with Quarter-elliptic Leaf Springs at both Wheels (illus.), 412
R.P.M., 398
Rubber Industry, Control of, 366
Rudd, Sapper, 46
Rules for Motorists, Traffic, 258
Rumour, The Petrol (leader), 71
Runabout, The Morgan, 58
— — Premier, 523
Running in Free, Slow, 470
— of Aero Engines, The, 194
— on Coal Gas, 48, 442
— — Dissolved Acetylene, 292
— — Paraffin, 70, 178
— — Solid Fuel, 303
Run on the Post-war Clyno, A, 486
Rural Surveyor (letters), 67, 577
Rust, Cleaning off, 249
Rustless Steel Finishes, 444

S

Saddle, An Originally Sprung, 26
— Tap, A Waterproof, 419
S.A.E. (letter), 67
Safety of Three-wheelers, The, 423
Sailors, Petrol for, 510
Sale, Cancelling a, 156
— of Army Motor Cycles, 462
Salmond, J. L., Maj.-Gen., 525
— Maj.-Gen., C.M.G., D.S.O., C.V.O., R.A.F., 217
Salter, F. S. (letter), 335
Sampson, J., Lt. (letter), 109
Samuel, Sir Marcus, 34
Sapper Sub (letter), 529
Sarginson, H. (letter), 224
Saterthwaite, E., Late Sec.-Lt., R.F.C. (illus.), 79
Saxon Spring Fork (illus.), 114
Schebler Carburetter, A New, 429
— — — — Model, 551
Scheme, An Imperial Memorial, 488
Schools, Motor Cycle (leader), 317
Schroeder, R. W., Capt., 503
Scientific Products, British, 171
Scott Courier, The, 521
— Inclined Side-by-side Twin, The (illus.), 300
— Sociable, The (illus.), 242
Scout Aeroplanes in France, Squadron of (illus.), 217
— Giant Battleplane *v.* Single-seater, 107
Screen, A Novel Sidecar, 117
Screws, Removing, 180
Scutt, S. R. (letter), 393
Seal Patent Two-seated Sidecar, The (illus.), 552
Seaplane, Modern Types of, 372
Seaplanes with Wound Stripes (illus.), 571
Season, A Word in, 453
Second-hand Machines, The Renovating of, 237
— Motor Cycles, 540
— — Date of, 85
2nd Loot (letter), 291
Secretary of the A.C.U., An Open Letter from the, 508
Sedan Built on a Cygnet Chassis, A Motor Cycle (illus.), 383
Sergeant Mechanic, R.A.F. (letter), 225, 337
— 274 (M.T.) Co. (letter), 531
Service, Good and Bad, 86
Services, Sidecars in the, 499
Severe Criticism, 393
Shaft Drive, A Raleigh (illus.), 419
— — Some Suggested Designs for, 332
— — The, 319, 375
— Transmission, 494
Shaft-driven A.B.C.? A, 426
Shaler Anti-glare Lens, The (illus.), 95
Shank's Pony (letter), 511
Sharn, R. (illus.), 45
Sheffield Christmas Trial to Bridlington, A Start of (illus.), 536
Shellac Prohibition Removed, 545
Shell Co., The Post-war Policy of the, 278
Shock Absorber, The Best Type of Transmission, 332
Shrapnell-Smith, E. S., 500, 507
Side-by-side Twin, The, 7
Sidecar Ambulance for Two Patients (illus.), 227
— — Suggested by Chinook (illus.), 373
— — The Campion (illus.), 507
— Ambulances, 373
— — French, 239
— — In France with, 28
— A Peace Model, 497
— — Sociable, 552
— — Tank, 470
— Attaching a, 70
Sidecar Body, A Simply-constructed, 237
— — The Position of the, 519, 578
— Chassis as a Check on Skidding, 250
— — Design, 561
— Connection, Improved, 90
— Connections for Spring Frames, 468
— from Burma, A Home-made, 393
— Lamp, Pipe from Generator to, 318
— Models, British and American, 417, 464, 487
— Renovation, 212
— Screen, A Novel, 117
— Skid? Does a, 401
— Suspension, 177
— Wheel, Changing the, 20
— — Springing, 377
Sidecarrier, A Useful, 154
Sidecarring in the Midland Counties (illus.), 436
Sidecars, Chinook and Ambulance, 153
— Henderson, 507
— in the Services, 499
Side-slip, Checking Inward, 328
Side-slipping, Spinning and, 328
Sikorsky, M., 347
Silencer, Improved, 204
Silent Aeroplanes, 65
Silver Badger (letter), 128
— War Badge, 404
Simple and Inexpensive Motor Cycle for the Peaceful Potterer, 313
— Cycle Car, The Very, 21, 165
— Home-made Decompressor, 112
Simplifying the Dynamo Lighting Set, 234
Simply-constructed Sidecar Body, A, 237
Simpson, F. (letter), 247
Sims, J. A. (letter), 186
Sinclair, J. H., Sgt. (letter), 153
Singer Racing Engine with Water-cooled Head, The 3½ h.p. (illus.), 299
S. Ingle Cylinder (letter), 335
Single-cylinder Cycle Car, The, 73
— in Competition, 42
Single-lever Carburetters, The Design of, 208
Single-seater Scout, Giant Battleplane *v.*, 107
Single-track Machine, A Four-seated (illus.), 310
— Passenger Machine, The, 310
Single *v.* Twin in Competitions, 125
Sinnott, D. J. (letter), 335
Simplex Auxiliary Unit (illus.), 141
Sissons, E. A. (letter), 464
Situation, The Fuel, 177
Six-stroke Engine, The, 402
Skidding, Sidecar Chassis as a Check on, 250
Slide Valve Engine, A, 551
Slipping Belt, A, 313
Slow Running in Free, 470
Small End Bush, Extracting a, 182
Smart, B. A., Lt. (Hon. Capt.), D.S.O., 327
Smith, Capt. Geoffrey, 101
— Major Valentine (illus.), 45
— Sgt.-Mechanic, 369
Sociable Sidecar, A, 552
— Three-wheel, 90
Society of Motor Manufacturers and Traders, 477
Soldered Metal, Bluing, 203, 294
Soldering Bowden Wires, 294
Soldiers and Others, Petrol for (leader), 157
— — Sailors, Petrol for Discharged, 477, 500, 501
— on Leave, Petrol for, 84, 109, 128, 154, 174, 201, 248, 291
— Petrol for Discharged, 174, 226
Solo Riding, Higher Gears for, 21
Some Casual Notes, 72
— Reminiscences, 514
— Uneonventional Valve Designs, 138
Soon, Petrol, 449
Sopwith, T. O. M., 541
S.O.S. (letter), 67
— in the Air, 281
South Australia, Road Racing in, 33
Spanners, 112
Spare Parts, 449
Sparking Plugs, 302
— — Gears and, 250
— — Mica, 487
— — The, 172
— Plug Troubles, 355
Sparklets, 90, 204, 378, 468
Sparks, The Advantage of Two, 190
S.P.C.M.C., A Case for the, 532
Spectacles, The British Airman Seen Through French, 434
Speed, 250
— and Bombing, Ground, 147
— — Consumption, Weight, 24
— Gear Control (leader), 399
— Judging 147
— *v.* Manœuvrability, 409
Speedometer for? What is a, 493
Speeds, Climbing, 369
— How Many, 554
— Record, 48
Spinning and Sideslipping, 328
— Nose Dive, The, 261
Spiral Nose Dive, The First, 199, 224
Sphinx Manufacturing Co., The (letter), 356
Sporting Tourist (letter), 417
Sportsmanship in Aerial Fighting, 170
Spot, A Breezy, 259
Spring Fork Designs, Three New, 278
— Forks, 422
— — Designed by F. E. Baker and F. J. Biggs (illus.), 278
— Frame Device, A, 176

Spring Frame Embodying Two Pairs of Coil Springs (illus.), 334
— Frames, 52
— — Motor Cycles and, 410, 437
— — Sidecar Connections for, 468
Spring-operated Petrol and Oil Injector, A, 318
Spring, Supplementary, 337
Springing, Front Wheel, 114
— Sidecar Wheel, 377
— System, The Brophy, 514
Springs for Triumph Forks, Rebound, 26
Sprung Saddle, An Originally, 26
Squadron of Scout Aeroplanes in France (illus.), 217
Stability, Directional (leader), 379
Stag Blower-cooled Engine (illus.), 342
Stanbury-Madeley, C. (letter), 174
Standardised Frames, 462
— Motor Bicycle, The (leader), 379
Standardisation of Tyre Sizes, 428
Stanesby, J. A., Cpl., R.E. (letter), 118
Stanhope Three-wheeler, The (illus.), 240
Starley, W., 100
Start Easily, How to, 532
Starters, Mechanical Engine, 187
Starting after an Overhaul, 250
— and Airtight Joints, Easy, 355
— Device, An Easy, 117
— Difficult, 228
— Difficulty in, 67, 109, 200, 294
— Tip, Easy, 112
Statax Three-cylinder Rotary Engine, The (illus.), 94
Stationary Engine, 442
Steam (letter), 153
— (and Still Steaming) (letter), 510
— Cycle Cars, 247
— — General Arrangement of a (illus.), 365
— — The (leader) 205, 365
— Motor Cycles, 153, 201, 510, 529
— Road Vehicles, 90
Steel Finishes, Rustless, 444
— Roads, 273
Steerable Wheel for Three-wheeler, A, 468
Stellar Vertical Twin Water-cooled Two-stroke Motor Cycle, The (illus.), 299
Stevens, W. J. (letter), 68
Stewart, Douglas (letter), 118
Stiff Climb, A, 174
St. J.H. (letter), 355
Stodart, D. E., Capt. (Temp. Maj.), D.F.C., 327
Stolen Motor Cycle, 188
Stonebridge Hotel, Meeting of Motor Cyclists on Armistice Day at (illus.), 499
Stopping a Petrol Leak in Mid-air, 261
Storing a Motor Cycle, 358
Stove Enamelling, 490
Strafing a German Sausage, 145
— Ground, 408
Straight Tube Frames, 555
Streamline, The Question of, 380
Streamlined Fins, 158
Streamlining, 253
— a Motor Cycle (leader), 229, 314, 418
— Effect for Motor Cycle (illus.), 314
Stunt Flying, 40
Stunter, A Mascot of the Tank Corps (illus.), 34
Sturmey-Archer Clutch Adjustment, 26
Substitute for Carbon Brushes, 318
Successful Appeal, A Motorist's, 386
Sudden Throttling Down, 40
Suez Canal, On the Banks of the (illus.), 185
Sufferer (letter), 68
Suggested Method of Cooling, A, 269
— Trial, A, 509
Suggestion (letter), 529
— A, 126
— War-worn Machines, A, 461
Suitable Mount, A, 437, 464, 487
Sultan of Egypt's Bodyguards with Douglas Motor Cycles (illus.), 108
Summer Scenes in Many Counties (illus.), 136
Sunbeam Shock Absorber System (illus.), 332
Sunday Morning Service at French Aerodrome (illus.), 329
Sun-Vitesse Frame, A New, 92
— Post-war Model, The (illus.), 354
— V Twin Two-stroke (illus.), 61
Supercharged Six-stroke Engine, A (illus.), 403
Supplementary Spring, 337
Supplies and Demand, Post-war, 322
Surrey, Middlesex Volunteers Explore, 215
Surveyor wants Petrol, 228
Suspension, Sidecar, 177
Suttoneer (letter), 530
Swan Bicar, The (illus.), 98
— Design Embodying Quarter-elliptic Springs (illus.), 410
Sweepstake, Coventry Motor Club's, 164
System, The Brophy Springing, 514
— — Petroil, 294
Systems, Braking, 319, 578

T

T. (letter), 153
T.A.C. Motor Cycle with a V Twin Engine, A Shaft-driven (illus.), 495
— Spring Frame, The (illus.), 410
Taking a Machine to Australia, 70
Tallboys-Getting, W. C., The Late, 193
Tandem-seated Cycle Car, The, 74
Tandem-seater, Advantages of the, 74
Tangents of Observation, 217, 268, 314, 336, 418
Tank and Infantry Attack in France (illus.), 248
— An Improved, 63
— Corps, The, 404
Tank Crew on the W. Front, A (illus.), 188
— Emptying Petrol, 470
— Honours, 101
Models (illus.), 47
on the Western Front, Wrecked, 568
Sidecar, A, 470
Stopped on Flooded Road (illus.), 322
Story, A Good, 165
Tanks, Detachable, 105
during German Offensive, 10
Going into Action on Western Front (illus.), 466
in Action, 163
— Some Notes on the French, 296
— The Victorious (illus.), 163
which Helped to Smash the Hindenburg Line (illus.), 400
Tapping, Konking, Knocking, and, 430
Tavernier, E. (letter), 579
Taxation Licence, The Local, 358
Tax on Motor Cycles, U.S.A., 34
— The Luxury (leader), 135
Teaching Driving, Petrol for, 203
Technical and Administrative Commissions in the R.A.F., 387
Motor Journals, 326
— Papers Wanted, 43
— Terms, 54, 153
Telescope Stand seen at French Aerodrome, A Unique (illus.), 146
Ten Million for Roads, 564
Ten Thousand Aeroplanes in all the Air Armies, Not, 169
— — Raiders, Fleet of, 122
Terms, Technical, 54, 153
Testing in Magneto Manufacture, 345
— Renovated Aero Engines on Western Front (illus.), 167
The Air Scout, 243
— Bicar, 97
— Spring Frame, 580
— T.T. in 1919, 529
Think Imperially, 530
Thomas, N. (letter), 187
Thompson, Gunner A. L. (letter), 21
— R. (letter), 248
Those Little Worries, 438, 487
Thousand Mile Ride in India, A, 159
— Miles on a Big Twin, A, 96
Threads, Nuts and, 21, 67
Three, Accommodation for, 254
Three-jet Binks Carburetter, The, 192, 247, 267, 293, 336, 357, 395, 438, 511
Three New Spring Fork Designs, 278
— Speeds or Four Speeds? 375, 509
Three-wheeled Car (illus.), 225
— Cycle Cars, 394, 438
— — Car, The, 240
Three-wheeler, A Premier, 385
— — Steerable Wheel for, 468
Three-wheelers, 487
— Ixion and, 581
— The Safety of, 423
— — Truth about, 471
— Wanted, More Choice of, 175, 357, 394
Three-wheel Sociable, 90
Throttle, An Exhaust, 294
Throttle-controlled Force Feed Oil Pump, A, 441
Throttle Control Lubrication, 384
— — Stop, A Home-made (illus.), 470
Throttling Down, Sudden, 40
Through Feminine Goggles, 129, 553
Thrust of the Air Screw, The, 80
Tilston, Edward (letter), 337
— Engines, Ltd., 84
Timing, 467
— an Old Engine, 398
— Douglas, 377
— Mechanism, 36
— of the Norton Engines, The, 33
— Pinion, Removing a J.A.P., 89
— Protractor for Engine, 112
— Two-stroke Ignition, 420
Tip, Easy Starting, 112
Tips on the Use of the Yankee Brace, A Few, 318
T.M.C. Water-cooled Engine, The Four-cylinder (illus.), 298
Tokaido, On the, 565
Ton Miles per Gallon (leader), 179
Toolproof Finish, A Non-rusting, 543
— — Wanted, a Non-rusting, 519, 555, 462, 554
Too Strong a Mixture, 270
Topic for Discussion, A, 134
Torkington, A. W., Mr., 78, 405, 507
Torpelle Three-wheeler, The (illus.), 241
Torque (letter), 66
— in Motor Cycle Engines, 301
— Reaction, 12
Toy, A Lightweight that is not a, 567
Trade, Increasing the British Export, 190
— Numbers, 70
— Queries, 338
— Rider, Trials of the, 131
Traffic Rules for Motorists, 258
Trail, Front Wheel, 265
Training a Pilot (illus.), 457
— for Invasion, 45
— — R.A.F. Recruits, 79
— of A.S.C. Motor Cyclists, The, 279
Train, Motor Cycle or, 171
Tramway Lines in Dilapidated State (illus.), 473
Transatlantic Aerial Liner, A (illus.), 128
— Flying, 79
Transfer of Officers to R.A.F., 167
Transfers, Fixing, 48
Transmission, Early Experiment with Air Screw, 173
Shaft, 494
Shock Absorber, The Belt Type of, 352
Transport, Civil Aerial, 503
Column, Bombing a, 261
Transporting the Wounded, 185
Traveller (letter), 84
Travellers' Association, Proposed Motor Trade, 68, 84, 128
Travelling, A Comparison in the Cost of, 171
Trecer Piston Valve (illus.), 139
Trenchard's Crowd, 350
Trial, A Suggested, 509
Trials in America, Consumption, 33
— of Pre-war Days, Christmas, 536
— the Trade Rider, 131
Triangulated Frames, Two Types of, 92
Tricky Repair Work, 70
Triplanes, A Squadron of the Famous Caproni (illus.), 369
Triplane, The French Voisin (illus.), 81
Trophies, Among the, 13
Trouble, A Baffling, 270
Truffault Spring Fork (illus.), 116
Triumph Cycle Co., Ltd., The, 501
— Equipped with Electric Lighting (illus.), 33
— Forks, A Rebound Spring for, 26
— in South Africa, A (illus.), 482
— Rear Braking System, The (illus.), 320
— Spring Fork (illus.), 114
Triumphs in Mesopotamia (illus.), 59
Truing a Belt Rim, 110
Truth about Three-wheelers, The, 471
T.T. Course, The Condition of the, 557
— in 1919, The, 529
Tube Frames, Straight, 555
Tuition, Unsatisfactory Motor, 275
Turbine, An American Aeroplane (illus.), 4
— Pickard's Gas (illus.), 6
— The Dunlop (illus.), 5
— — Esnault-Pelterie (illus.), 5
— — Morgan (illus.), 5
Turbines and Rotary Engines, Some Internal Combustion, 4
Internal Combustion, 42, 57, 105
Tweedledum and Tweedledee (letter), 23
Twin, A Harley-Davidson Flat, 280, 288
— — Thousand Miles on a Big, 96
— Connecting Rods, 490
— in Competitions, Single v., 125
— The Levis Post-war, 32
— — Raleigh Horizontal, 280
— — Side-by-side, 7
— Two-stroke, A V, 492
Twins, Oiling Flat, 180
Two More Motorised Bicycles, 296
Sparks, The Advantage of, 190
— Thousand Miles on a Humber Flat Twin, 323
— Tracks (letter), 268
— Workshop M.T. Corporals (letter), 68
Two-speed Gears, Foot-operated, 158
— Model, Converting a Single-speed to a, 516
Two-stroke, A Lightweight, 24
— — V twin, 492
— Decarbonising, 316
— Engine Designed by D. J. Hathaway (illus.), 119
— Flat Twin Engine used as a Power Unit, 69
— Ignition Timing, 420
— Road Test of a New, 354
— with Variable Compression, A, 385
Type of Magneto, Choosing the, 183
— Which, 448, 474, 477
Types of Aeroplane Engines, 504
— — Seaplane, Modern, 372
Typical Lightweight Mounts (illus.), 425
Tyre and Rim Sizes, 228
— Sizes, Standardisation of, 428
Tyseley Three-wheeler, The (illus.), 240

U

U and I Sidecar on Road (illus.), 552
Udge, R. (letter), 42
Unconventional Valve Designs, Some, 138
Unequal Cooling, 224
Unger, Edward, 243
Unicycle, An Experimental Model (illus.), 16
Uniform of the Flying Service, 11
— The New R.A.F., 105, 167, 188
Unsatisfactory Motor Tuition, 275
Unstable Machine, The Case of the, 328
U.S. Army, Motor Cycle Waste in, 258
— Motor Cycles, Petrol Consumption of, 142
U.S.A. Army, New Imperial Machines for, 393
— Motor Cycle Supply in, 386
— Tax on Motor Cycles, 34
Units, Electrical, 54
— of Capacity and Power, The, 55
— — Power and Work, 54
Urgent Matters, 469
Use for Old Files, A, 522
— of Petrol, The, 24, 110, 203
Useful Manual for Motor Cyclists, A, 152
— Sidecarrier, A, 154
Using Paraffin, 89

V

Vacuum aft of the Cylinder, A, 463
Vallis, E., Artificer-Sapper (letter), 531
Valve, A New Rotary, 222
— Breakages, Cooling and, 158
— Breaking Exhaust, 89
— Caps, Leaky, 89
— Compression Release, 204, 224
— Design, Exhaust Poppet, 21
— Designs, Some Unconventional, 138

Valve Queries, 270
— Setting, 395
Valves, Overhead, 180
Van der Mee, Mr., 116, 120
— — — Spring Fork, The (illus.), 116
— — Schalk, H. (letter), 292
— Deventer, J. L., Lt.-Gen. Sir, 191
— Gent Spring Frame, The (illus.), 411
Vandervell, C. A., 378
Variable Camber, 67
— Compression, A Two-stroke with, 385
Vehicle Order, New Government, 326
Veterans' Association, The (letter), 488
Vibration, Explosion Pressure and, 108, 154
Victor Flat Twin Engine, The, 518
Victoria Road, Capetown (illus.), 560
Victorious Tanks, The (illus.), 163
Visit to an R.A.F. Reception Depot, 50
Voisin Triplane, The French (illus.), 81
Volunteers Wanted, Motor, 366
V.P. (letter), 201
V Twin, In Praise of the, 176
— — Two-stroke, A, 492

W

Waddington, Geo. T. (letters), 44, 155
Wakefield, Charles, Col. and Alderman Sir, 546
Walford, E. W., Capt., R.A.F., 118
Walker, F. E., Sgt., 191
Wall Bicar (illus.), 97
— Motor Cycle with Shaft Drive, The (illus.), 495
— Tricycle, The (illus.), 240
Walmsley, A. M., The Rev. (letter), 126
Walton, Capt. E. W., 101
Wanted, a Food Control, 394
— — Non-flam. Aeroplane, 284
— — Non-rusting Toolproof Finish, 319, 355, 462, 554
— Experiences, 178, 250, 490
— More Choice of Three-wheelers, 175, 357, 394
— Motor Volunteers, 366
— Technical Papers, 43
War Badge, Silver, 404
— Benzole after the (leader), 111
— Loan, To Help the, 109
— Petrol and Knocking, 462, 511
— Roads, 568
War-worn Machines, A Suggestion, 461
Ward Concentric Valve Arrangement, The (illus.), 138
Ward-Parker, Cpl., 59
Ward Price, G., 406
Warning, A, 462
Wastage, Hun Aeroplane, 262
Waste in the U.S. Army, Motor Cycle, 258
Water-cooled Cylinder being Tested against an Air-cooled (illus.), 269
— Motor Cycle, The, 297
Water-cooling, Air v., 357
— Four Cylinders and, 18, 200
Water, Hydrogen from, 22
Waterproof Saddle Top, A, 419
Watson, Dr. (letter), 187
Watts, J. (letter), 437
W.B., Capt., R.A.M.C., 86
Weakness of the Barometer, The, 148
Wear and Tear of Machines Crossing the Atlantic, 121
Weatherproofing (leader), 205, 381
Webber, C. R., Lt., 59
We Don't Want it Now (leader), 271
Weight, Speed, and Consumption, 24
Weights, Some Comparisons, 145
Welcoming Them Home, 478, 555
West, F. M. F., Capt., M.C., R.A.F., 455
Whale, P. (letter), 418
What of the Future?—Peace! 446
Wheel, Changing the Sidecar, 20
— for Three-wheeler, A Steerable, 468
— Springing, Front, 114
— Trail, Front, 265
— will Lift? Which, 145
Which is Number One Cylinder? 294
— Type? 448, 474, 477, 499
— Wheel will Lift? 145
Whippet Tank on Duty, A (illus.), 326
White and Poppe Engined Machine, An Example of Weatherproofing on a (illus.), 382
— Flag in a New Sphere, The, 281
— Knight, The (letter), 463
Whitehead, J. A., 369, 506
Whiting Motor Cycle Embodying Half-elliptic Springs at both Wheels (illus.), 412
W.H.M. (letter), 84
Who was the First Sailor to Fly? 281
Why not a Petrol-electric Motor Cycle? 435
Wicker Body, Renovating a, 532
Wigg, R. M. (letters), 462, 555
Wilding, Robert, Mr., 57
Wilkinson By-pass, The (illus.), 470
Williams, H. T. (letter), 44
— Lionel (letter), 21
Williamson Landaulet, The (illus.), 255
— Three-wheeler, The (illus.), 241
— Water-cooled Flat Twin, The 8 h.p. (illus.), 299
Wilson Slide Valve Engine, The (illus.), 551
Winged Warfare, by Major Bishop, 123, 165, 195
Winter Garb, Motor Cyclists in (illus.), 453
— Trials, Reminiscences of Pre-war (illus.), 534
Winwood, W. C., Pte. (illus.), 10
With the Flag through German East Africa, 468
W.J.B. (letter), 154
Wolf Lightweight, The (illus.), 210
Women, A Call to, 374
Women's Air Force, 479
— Royal Naval Service, The, 232
Wonders, Naval Aircraft, 547
Wood, Basil G. (letter), 127
Wooler, The Flat Twin, 485
— The Neatly-sprung Wheel of the (illus.), 412
Woollett, H. W., Capt., D.S.O., M.C., R.A.F., 281
Wolseley Exhibit on Birmingham Win-the-war Day, The (illus.), 307
Woolwich Club Meeting Called, 522
Word in Season, A, 453
Worker (letter), 109
Workers, Petrol for, 126
Workshop, An Amateur's (illus.), 542
— and its Equipment, The Motor Cyclist's, 542
Works Lighting, 378
Worries, Those Little, 438, 487
Wounded, Transporting the, 185
Wright, A. C. (letter), 313
Writing Advertisements, On (leader), 229
W.R.N.S. Lorries (illus.), 232
— Motor Cycle Despatch Riders (illus.), 232, 233
W.S.B. (letters), 267, 395

Y

Yankee Brace, A Few Tips on the Use of a, 318
Youngblood Magnetically-operated Piston Valve, The (illus.), 139
Young, C. M., Pte. (Act.-Cpl.), 191
York and District Motor Club, The, 577

Z

Zaharoff, Sir Basil, 105
Zenith Design with Leaf Springs, The (illus.), 412
Zephyr Motor-assisted Cycle, 140
Zepp., Engaging a, 432
Zooming, 41

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One-lever Carburetters.

IN our Correspondence columns there have appeared on many occasions letters in which the writers criticise the two-lever carburetter, demand a reduction in the number of "twiddly-bits" on the present-day motor bicycle, and ask for readers' experiences with the single-lever variety. We have referred more than once to this matter, as we have long felt that the two-lever carburetter has had its day, but we do not wonder that it has survived so long for the following reasons.

Properly tuned it gives ultra-efficiency—that is, maximum power and maximum economy—is cheap, and is good enough for the single-cylinder motor bicycle; but it is safe to assume that after the war multi-cylindered motor cycles will be even more popular than they are now, and it is on the multi-cylinder engine that the automatic carburetter is seen at its best.

Nothing is more annoying to the motorist of wide experience—that is to say, experienced with both cars and motor cycles—than to have an engine which should be flexible, but the flexibility of which is destroyed simply because the carburetter is not designed to allow the engine to fire evenly at low speeds. Unless it is so designed half the flexibility of the engine is destroyed, and with it, of course, half the pleasure of riding. Those whose riding is done upon country roads will not appreciate this to the full, but the motor cyclist who has much traffic to negotiate often becomes exasperated when an attempt to close the throttle will result in the stopping of the engine. Again, if a clutch is fitted and the rider is temporarily held up, nothing is more annoying than to hear the engine tearing its heart out instead of ticking over quietly.

Our experience of the automatic carburetter has been fairly extensive, though not quite so extensive as we should have liked, due to the fact that so few were on the market before the war. We have found that the best automatic carburetters give practically the same power as the non-automatic type, but are necessarily slightly more extravagant in fuel, but both these disadvantages are outweighed by the fact that the engine is completely and absolutely flexible.

The best results we have obtained so far have been from that type of carburetter which has no moving parts other than the single throttle. It was a carburetter designed primarily for cars, and with it some of the finest speed successes in classical races, both on the track and on the road, have been obtained. It is extremely neat as regards outward appearance, and the simplicity of its design, owing to the fewness of moving parts, renders it highly suitable for fitting to a motor bicycle engine, but the chief factor against its universal adoption is its comparatively high price. This, however, could be overcome if it were turned out in large quantities.

Another carburetter, with which we have had experience, is also a development of a car carburetter, but this, again, owing to the war, has not been sufficiently developed. Our experience proved that it was, or could be made, quite satisfactory, but the main disadvantage was that it was fitted with an automatic valve controlling both the air and jet opening, and this valve was likely to become choked with grit when a ride was undertaken in wet weather.

A third that we have tested is the only make of automatic carburetter which has been specially designed for motor bicycles, and turned out in quantity. This, again, was satisfactory in all essentials.

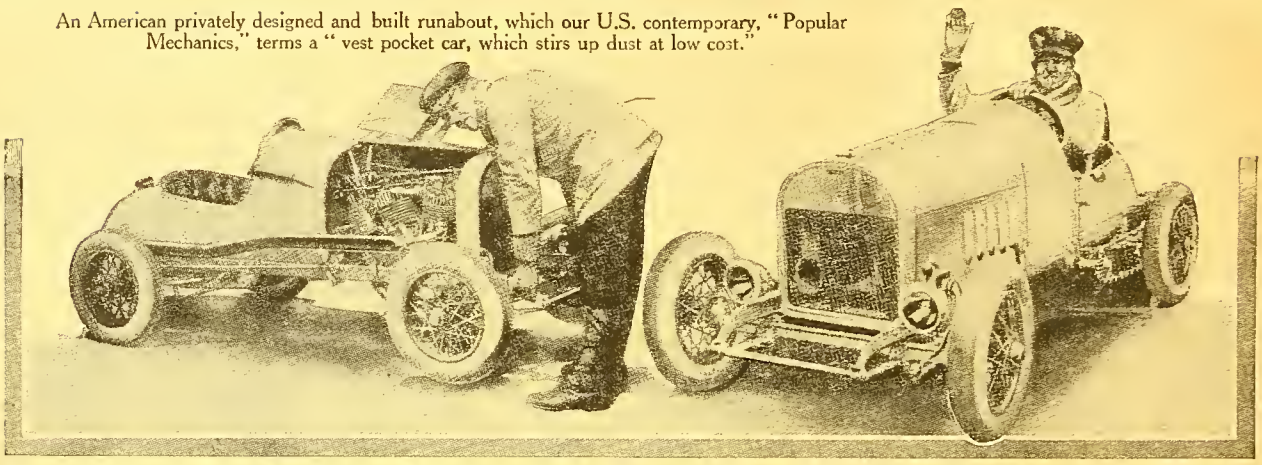
The whole question is one which requires the most earnest consideration on the part of motor cycle manufacturers, and after the war we feel quite confident that our correspondents will have the choice of quite a number of carburetters which render the engine entirely flexible, are sold at a moderate price, and also give as much power and practically as satisfactory consumption as the two-lever types.

An index to the advertisements in this issue will be found on the page facing the back cover

THE REAL CYCLE CAR.

A FEW NOTES ON CYCLE CARS, AMERICAN AND BRITISH.

An American privately designed and built runabout, which our U.S. contemporary, "Popular Mechanics," terms a "vest pocket car, which stirs up dust at low cost."



ALTHOUGH the American cycle car "boom" fizzled out, as it did in this country, when the paper promises failed to fructify, it will always stand to the credit of the junior automobile engineers of that country that their designs were more sound and the work more finished than was the case on this side of the Atlantic. In this country the demand existed, and still exists, for a type of passenger vehicle such as it is possible for the cycle car to be, but the majority of the machines did not "make good." Most of them were inefficient amateur-cum-garage erected machines, built singly, or in such few numbers that standardisation and interchangeability of parts did not exist. In America, however, quite a large number of makers were installed in well equipped factories where batches of fifty and a hundred were "put through" at once and everything standardised from engine parts to wheel bearings. The failure on the western side of the Atlantic was due to the fact that the demand only existed in over-enthusiastic dealers, who found that their interest was not shared by the buying public, because with petrol at about tenpence a gallon, and four-seater orthodox cars selling at a few dollars more than the selling price of the cycle cars, there was not sufficient argument in favour of the new type. Consequently the industry died a natural death, but a few private motor cyclists continue to produce an occasional vehicle of the type, and their efforts are keeping alive interest and expectation of something to come.

The average home or garage built cycle car in this country is deservedly designated a "contraption." The few privately built American machines which appear in print are better looking, and more closely follow the spirit of the cycle car.

We have several times illustrated examples of these sporting little machines, which, fitted with aeroplane wheels and tyres, are a feature of the big race meetings in Western America. The pictures given here depict one of the latest machines of this type, and no doubt it will appeal strongly to many readers. No attempt is made to produce a car with such a mixture of principles in mechanics that the result is a hybrid. This type of vehicle has merely a sporting little body on four wheels, a motor cycle engine and gear box and single wheel drive. The imitation radiator is made to contain the oil, and the fuel is carried in a tank at the rear, while the weight is about 3½ cwt. The writer ventures to think that the owner of a runabout on these lines would not consider it necessary to apologise for it, as is the case with many privately constructed vehicles in this country. There would be no need to explain to one's friends that "It is only a cycle car"; the fact is patent. SPES.

LOCAL AUTHORITY INTELLIGENCE.

THE following is abstracted from a recent issue of *The Autocar*: "As illustrating the casual manner in which the responsible duty of caring for the main roads of this country is relegated to officials of small local bodies, the case of Calne (Wilts.) may be cited. For one and a half miles the main Bath Road, over which in normal times an enormous volume of traffic passes, and which in the present abnormal times carries an immense number of heavy military vehicles, runs through the area controlled by the Calne Town Council. It is part of the local surveyor's duty to keep this road in proper order. At a recent meeting of the Town Council the surveyor, who also held the office of inspector of nuisances, resigned after thirty-four years' service. The two offices are now separated, and the small importance attached to the office of surveyor may be judged from the following record of the appointment: 'It was resolved that —— ——— be appointed temporarily as surveyor, caretaker of the recreation ground, controller of the hatch bar, toll collector, etc., at a salary of 35s. a week, plus the usual commission on tolls and a salary of £3 per annum for controlling the hatches.'"

The only parallel that we can think of is that of the teacher paid £2 per week for making and moulding the characters of the future generation, while the school window cleaner and caretaker gets £3 a week, or sometimes 35s. a week and "all found."

OCCASIONAL COMMENTS

BY "IXION"

Some Stunt.

WILD rumours reach the office that an irrepressible motorist, shorn alike of his gas and petrol permits, has invented a retort which brews an uncontrolled gas, consumable in petrol engines. No details are yet to hand, and it is hardly conceivable that any form of the retort should be sufficiently portable for motor cycling purposes. But what a brain, gentlemen! I am perishing to get hold of the recipe, if only that I may annoy my local constabulary until the Petrol Controller takes this fuel also under his paternal wing. I have even lain awake at nights scheming how to house a wood fire in a steam motor bicycle, simply to get my own back on the blue-coated Prussians who beset me when I use my two gallons per month. But a retort to brew uncontrolled gas—why didn't I think of it?

Finis to Another Chapter.

TWO gallons a month used to go a long way with certain people. A shrewd constable, himself a pre-war motor cyclist, reckoned up their apparent mileage, and found their monthly mileage worked out at over 400. If he had been genial and unintelligent, he might not have smelt a rat; but as it was, he reflected sourly that they worked at a Government factory, to which petrol was supplied for official purposes. So, when all the shops were humming, early in the morning, he crept cat-footed in the official garage, and gauged all the fuel tanks, repeating the process towards evening. An ignoramus might have fancied that petrol expands at the rate of 50% during eight hours in a cool shed. Not so our plain, intelligent constable. The Berkeley Street list of permits is now fractionally shorter. Even so, they do these things better in France. What's the matter with dyeing all official petrol?

A "Push" against the Costlier Sidecars.

I SEE a reader is clamouring for more attention to be given to the simpler cycle cars in our pages now that the light car has yielded to the gradual blending of big and little cars. The plain fact is that at the moment the simple cycle car is defunct. The Morgan is practically the sole survivor of many prophets born before their time, and as the belligerents have no use for cycle cars, even the Morgan is more or less in a state of suspended animation for the time being. When peace returns the cycle car world will begin to sizzle. It has often sizzled before, and to no lasting purpose; but this time, if there is sufficient free capital seeking investment after so many millions have been sunk or exploded, I think we shall really get a select fleet of good cycle cars, designed by *pukka* engineers and produced by *pukka* factories, as opposed to the back street tin-and-a-file type of 'bus. At any rate, I know of several responsible inventors who admit that for £120 or so a driver has a right to more comfort and protection than the most luxurious sidecar offers him. Should these plans materialise, our pages will be overflowing with news. Till then the press can only hint and the public can only dream and guess. For the moment we will not stir the hideous past and raise dead ghosts of obsolete atrocities now interred in a merited oblivion.

Diagnosing Refusal to Start.

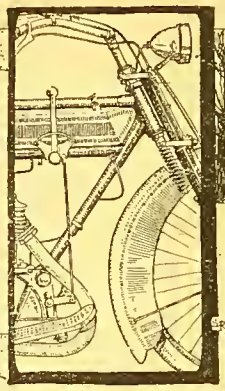
I HEAR a certain garage habitually uses coal gas for the quick diagnosis of "won't startitis."

A rubber tube connected to the gas-supply is pushed into the air intake of the carburetter. If the engine will then start, the trouble has to do with carburation; if the engine still will not start, it is 100 to 1 on an ignition defect, with a distant mental reservation in favour of valve trouble. A similar method is useful for warming up engines which will not run steadily on war spirit until the cylinder is hot.

It is a pity that this simple dodge is not applicable to roadside use, as it is possible to waste quite a lot of time deciding whether an obscure trouble is connected with the ignition or the carburation; though this, of course, particularly applies to cars.

The £25 Machine.

A CORRESPONDENT asks me to pass on his pathetic appeal to the trade. He lives in one of the new villa suburbs, is married, and middle-aged. For years he has hankered to own a motor bicycle from pure sporting motives. He has never been able to buy one because he married young, and now that his income is greater his family expenses have increased. He used to spend his Saturday afternoons watching professional soccer. Since the war he has worked on an allotment, and finds that the exercise is much better for his health than the stationary excitement of barracking referees. But he considers gardening on allotment lines dull and too utilitarian. On Sundays he can find no outdoor recreation except gardening and walks, and he has exhausted all the walks within easy reach of his home. Many square miles round his house are occupied by villa dwellers confronted with similar alternatives. He states that £50 for a motor bicycle is too large a capital outlay for him and his *confrères*, but that thousands of such men would buy motor bicycles at £25, with unimaginable benefit to their health. If Henry Ford can produce five-seated 20 h.p. cars at £75 in America, can nobody sell a simple single-cylinder motor cycle of some touring capacity at £25 a time? I fear that the answer is "Yes" if only some firm possessed the necessary inclination. Existing works can earn all they want with less trouble by making a costlier pattern in small quantities.



Some Internal Combustion Turbines and Rotary Engines.

Accomplishments and Possibilities in a Little Explored Field.

Almost every amateur designer is tempted to try to solve the problem of the internal combustion turbine, therefore a brief review of some of the designs which have been tried will no doubt interest these enthusiasts and motor cyclists generally. The designs reproduced are only a few of the many which have passed through the Patent Office during the past decade, but they will serve to show that the problem has received more attention than at first would be supposed.

LIKE perpetual motion and the lost Eldorado, the internal combustion turbine continues to be a fascinating subject to many who strive to solve the greatest problems. No doubt the gas turbine is the greatest problem connected with internal combustion engineering, and the unqualified success of the steam turbine in supplanting engines of the reciprocating type in so many fields doubtless induces inventors to attempt to revolutionise the petrol engine in a similar manner.

At a meeting of the Graduates' Branch of the Institution of Automobile Engineers quite recently, a member of the Institution read an interesting paper on this subject, from which one gathered that there was very little to be gained by such a power plant for automotive purposes. The enormously high speeds at which a turbine must run to be efficient are said to place the turbine outside the scope of road vehicles.

We need not go too deeply into the technics of the turbine, but it will be appreciated that the transmission problem would become extremely difficult to solve when we say that turbine speeds of 30,000 r.p.m. are not considered excessive for a gas turbine.

The Question of Compression.

Quite a number of internal combustion turbines have been made—and made to run—but one of the chief difficulties has been to provide the necessary compression of the gas. As is well known, high efficiency can only be obtained when the gas is highly compressed. In a reciprocating engine no additional means to compress the gas are necessary, as the piston designed to utilise the power of the expanding gases can be, and is, used to create the initial pressure on the back stroke.

With a turbine running constantly in the same direction, the compression is not possible by the turbine wheel, but some other means has to be introduced. The internal combustion turbine, therefore, is composed of two units—a compressor and the prime mover—while in a reciprocating engine a single unit performs both functions. In fact, in a two-stroke engine, the compression of the charge utilises what, in some steam engines, is an idle stroke.

The main principle of the petrol engine is the same as that of the steam engine. The expansion of vapour or gas is made to move a piston down the cylinder. In the steam engine the combustion is external—that is, the actual power is made in a separate unit, *i.e.*, the boiler. An internal combustion engine is self-contained.

An Actual Example.

To build a turbine is a simple matter. It is little more than a glorified windmill. The difficulty lies in making it self-contained.

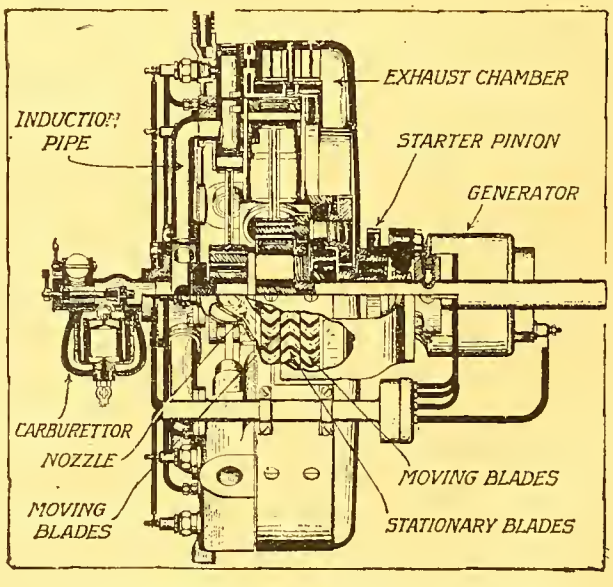


Fig. 1.—An American aeroplane turbine, perhaps the only internal combustion turbine to be placed on the market.

No one for one moment doubts the beauties and indisputable advantages of a purely rotary motion. We are forced, however, to give efficiency the place of honour, however much we may appreciate the qualities of extremely smooth running.

The search for the gas turbine having an efficiency comparable to that of the reciprocating engine has been a long and strenuous one, and has not yet been rewarded by success; but, quite recently, a turbine intended for aeroplanes was advertised in the aviation papers. An illustration of this design is reproduced here (fig. 1), and since no fewer than eight piston valves and cylinders are used to obtain the necessary compression, one wonders why the designers introduced a turbine into the design, since it is admitted that there are enormous losses in using the power in this way.

An interesting turbine with a reciprocating compressor was invented by Mr. R. E. Morgan, a Birmingham inventor, in 1909. Particulars of this design were given in *The Motor Cycle* at that time. This is illustrated on the next page, (fig. 2), and has the distinction of being the only turbine designed expressly for motor cycles.

The Morgan Turbine.

The turbine consists of a drum A, which revolves on a spindle B. The spindle is provided with an eccentric C in the middle, and is rigidly mounted between two side plates D and D_1. These side plates are bolted to a casing E, which has on its periphery external cooling fins and internal inclined vanes. The drum A (which is in halves bolted together) has its interior constructed in the form of a cylinder, with valves F F at each end. A double-ended piston, with valves H at each end, reciprocates in the cylinder; and when the drum is rotated, the eccentric C, acting alternately on rollers placed in the piston, moves the latter from one end of

1854 1918

From the Days of the Crimea

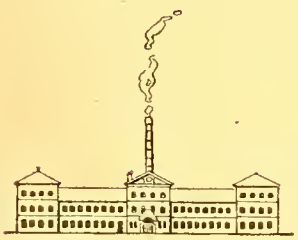
SOME EPISODES IN

B.S.A. HISTORY.

ORIGIN OF THE B.S.A. COMPANY

IT is an interesting fact that it was owing to a shortage of munitions during the Crimean War that The Birmingham Small Arms Company had its origin. The Government of that day found it necessary to call on 16 firms of Birmingham gun-makers to furnish a supply of arms, and from this beginning originated the great B.S.A. Factories which have, on more than one occasion, proved of National importance.

Though over 60 years have passed since the time of the muzzle-loader—entirely hand-made, and typically British in the excellence of its workmanship and material—B.S.A. productions have unceasingly maintained the same high standard of quality. To-day B.S.A. Bicycles and Motor Bicycles, by their reliable service under the severe test of modern warfare, are still upholding the great B.S.A. traditions.



Original B.S.A. Factory, 1861

THE BIRMINGHAM SMALL ARMS COMPANY LIMITED.
BIRMINGHAM.

All England will be Yours

VIVID are our mental pictures of the time when War's cruel fangs will be withdrawn, for still fresh in our memory are those glorious days when all England was our playground, and our ever faithful Clyno sped us over hill and dale.

And you? Have you forgotten that the beauties of old England shall never pass away?—that its mountains and its rivers, its country and its sea, all will be yours again to-morrow if you make your plans to-day?

The 8 h.p. Post-War Clyno will be an even better outfit than its famous predecessor.

Our future policy is mass production of one model — strictly competitive selling price and rotational post-war delivery within a specified time.

Talk to a Clyno agent now, and ask us for folder.

CLYNO

ENGINEERING CO.,
Pelham Street, Wolverhampton.

1516

In answering this advertisement it is desirable to mention "The Motor Cycle."

Some Internal Combustion Turbines.—

the cylinder to the other. Thus the interior of the drum is in the form of a double air pump, air being compressed at one end while it is induced at the other. The air is drawn in through several holes in the side plate D and openings J in the side of the drum,

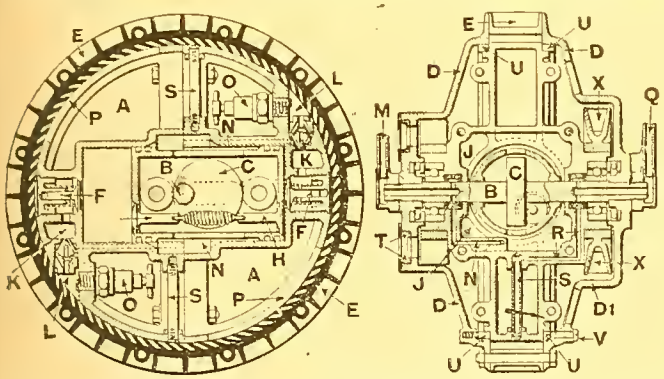


Fig. 2.—The Morgan turbine, an English motor cyclist's effort to solve the problem of the internal combustion turbine.

springs round the side plates. A pulley is shown at X.

The Esnault-Pelterie.

A very simple form of turbine is shown in fig. 3. This was invented by R. Esnault-Pelterie in 1907. The illustration shows a turbine wheel F arranged

water column is used on the turbine wheel. The two cylinders G and H are mounted above a water turbine wheel, and the water column actuating the wheel reciprocates, rising and falling in the two cylinders. In the position illustrated it is at maximum height in the left-hand cylinder G, and, assuming the

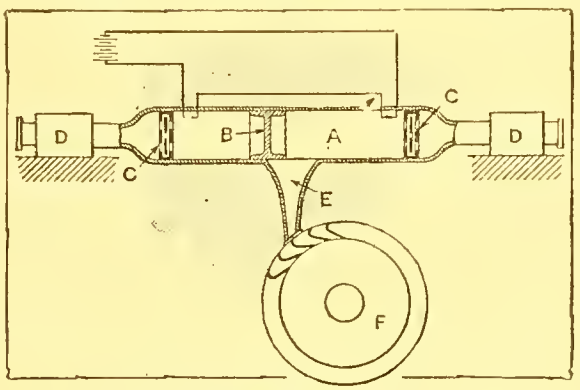


Fig. 3.—The Esnault-Pelterie turbine.

and is pumped into chambers K, whence it escapes through burners L by means of fine inclined holes meeting over the central holes of the burners. These jets of air induce petrol to flow from an external tank into the burners through a tube M, hollow spindle B, and holes N drilled in the framework of the drum. The junction at the burners of air under pressure and petrol immediately produces a fine spray, as in a scent-spraying apparatus, which, ignited by means of sparking plugs O, produces a large quantity of gas at high temperature and pressure; and it is this pressure, reacting from the vanes, which causes the drum to revolve. The exhaust gases escape through slots P in the rim of the drum into the interior, and out through holes Z in the side plate D_1 on the opposite side to that from which the non-carburetted air is drawn. As soon as the pressure of the first charge is reduced, other succeeding charges are pumped through the burners, and at a certain minimum speed the heat of the first charge ignites the subsequent charges, so that there is continuous combustion in the form of a bunsen flame at each burner. It is possible, therefore, after the initial start, to dispense with the use of sparking plugs. The heat developed at each burner is very great, and, as an aid to the cooling effect, water is fed into the hollow spindle by means of a tube K and sprayed on to the vanes of the outer casing through the rim of the drum by holes R and tubes S. The water sprays are operated by centrifugal force. The steam generated escapes with the exhaust through the side plate D_1. The air inlet in the side plate D is controlled by a lever and throttle plate T, which can be adjusted to give the exact quantity of air to suit varying conditions. Leakage of gases between the side plates and the drum is prevented by the split rings U, which expand outwards on to the side plates and are pressed gently inwards by small springs. The rings U are prevented from revolving with the drum by the screws V, which are placed alternately with the

beneath a cylinder A, which contains a free piston B. At C are inlet valves through which passes gas from the carburetters D, whilst E is a nozzle.

Assuming that the piston B is at the left-hand end and that the gas compressed by the piston is fired by means of the electric circuit indicated, it will be clear that the piston B will travel rapidly to the right, compressing the gas in the right-hand part of the cylinder. As soon as the nozzle E is uncovered, the expanded gases pass out and act upon the turbine wheel, and carry it round. When the gases have escaped, a vacuum is created in the left-hand end of the cylinder, causing the gas to be drawn from the carburetter. Eventually the piston comes to rest in the extreme right-hand position with a compressed charge to the right of it. This is fired and the piston is driven back, the same

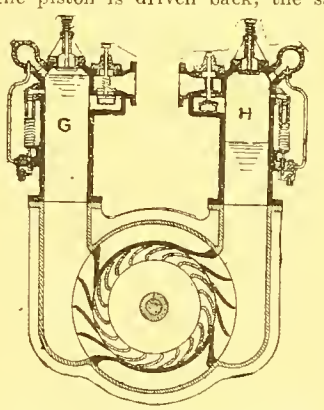


Fig. 4.—The Dunlop turbine, using a column of water in two pistonless cylinders.

sequence of operations recurring. The piston B is not connected to any crankshaft, it being important that it travels at a very high velocity across the exhaust nozzle E in order to induce a vacuum so as to refill the cylinder.

Fig. 4 is a more recent patent by James Dunlop, and in this case a reciprocating

gas above the left-hand end of the water column is fired as in the Humphrey pump, it will be clear that the water will be forced downwards in the left-hand cylinder and will rise in the right-hand one. In travelling from the cylinder G to the cylinder H it passes through the turbine and rotates the turbine wheel.

As the water column rises in the right-hand cylinder it compresses a charge of gas which is fired when the water column comes to rest, the water being then reciprocated. The turbine is specially designed to allow of reciprocation of the water, but it is not necessary in this brief description to refer to details of this or the specific operation of the engine.

A Lancashire Effort.

The turbine shown in section in fig. 5 has been patented by W. Pickard, of Bridge Street, Heywood, Lancs. The lay-out comprises a cylindrical combustion chamber A, and a piston B; a cover C in which are seated two inlet valves D D and an ignition plug E, and another cover F which separates the cylinder from a larger chamber F_1, in which is a rotor comprising a number of stationary rings G and rotating discs H, the latter having their peripheries shaped as vanes J, and themselves secured to the rotor shaft K. This shaft is extended into the cylinder A and piston B, and also forwards to carry a pulley or other means of transmitting the power. The lay-out shown provides a chain-driven shaft on which are mounted a centrifugal governor and linkage for automatically suspending (*i.e.*, holding closed) one of the valves D, and a magneto V. Presumably this lay-out may be modified, and the magneto and governor driven by a reduction gear.

A water jacket surrounds the working section—a point of special interest in regard to the difficulty, on account of the heat effect on the rotor blades, hitherto inherent in an internal combustion turbine. This feature also concerns the exhaust, which is discharged into the expansion chamber M, in which the pressure is reduced in part owing to the

Some Internal Combustion Turbines.—

expansion and the lowering of the temperature by means of the water jacketing. This exhaust outlet is at M_1.

The piston B has ribs S, which engage in grooves in the cylinder and serve to hold it against rotating while not impeding its fore and aft displacement. This piston is operated two-stroke fashion. In the cylinder A is a series of exhaust ports T, which by pipes U communicate with the inlet openings of the turbine. Upon the charge being ignited the piston is forced in a direction towards the turbine, and thereby, through the pins R and the grooves in the tube P and shaft K, causes the shaft K to be rotated. On nearing the end of its stroke the piston uncovers the ports T and thereby allows the unexpended portion of the explosive force to reach the turbine by way of the pipes U.

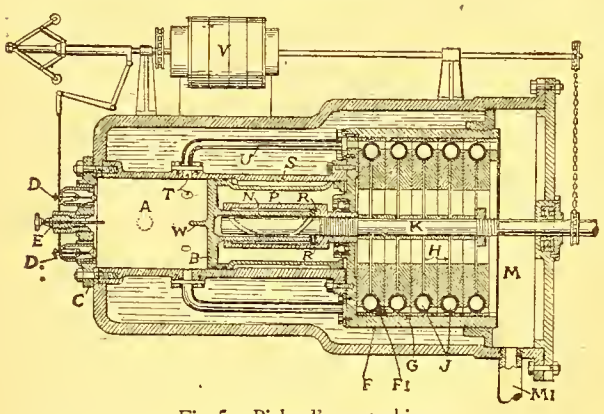


Fig. 5.—Pickard's gas turbine.

Rotary Engines.

Another form of engine, frequently referred to as the turbine, is the rotary type, in which there appears to be greater possibilities in connection with motors for road vehicles.

Fig. 6, the Oerlikon, a Swiss invention, is one of these.

The details comprise a water-jacketed casing A with closed ends, an interior drum B, and a shaft C, which carries a series of six pistons D. The latter project through the wall of the drum B and against the casing A. They are maintained equidistant by segments F interposed between ball sockets G. The rotating parts are mounted on an eccentric, so that, as the mass revolves, the size of the spaces E between the pistons, which spaces serve as combustion chambers, is varied uniformly.

The gas mixture inlet is at H, the petrol (or other liquid fuel) being pumped into the chamber U, which forms part of the jacketed casing, and therefore serves to gasify the fuel. The fuel is forced into the combustion chamber through the port H, the air having a separate intake at K, whence it is delivered into chambers M, and subsequently forced into the combustion chambers E. The air is partly drawn in by the fan-like action of the rotating drum, but an auxiliary air intake O is provided, from which air is forced by a fan N. This air is also used to scavenge the combustion chambers. The exhaust gases are discharged through the port F.

The cycle of the engine's action is as follows: When the motor is started, a current of air is blown through the passage parallel with the axis of the cylinder into the combustion chambers E. These chambers, during one revolution of the drum, operate as follow: As soon as a piston D has passed the exhaust port J, the air begins to be compressed, which continues until the pistons have passed the jets H, from which latter fuel is continually introduced into the combustion chambers. The moment the combustion chambers pass the jets the combustible charge, consisting of mixed air and vaporised fuel, is ignited by convenient means. The capacity of the combustion chamber increases only slightly while combustion is taking place, so that the pressure therein rises to a maximum. During further rotation of the drum the gas expands while the capacity of the chamber is increasing, and power is developed until the piston reaches the port J. The combustion gases now exhaust, and the pressure is equal to that at K, whereupon a current of air from the port K scavenges the combustion chamber. This action is common to each combustion chamber in turn.

Mounting of the Rotor.

The rotor is mounted in annular ball bearings W, supported in rings V. Staunchness between the combustion chambers E and the piston D is effected by a bar Q (at the right corner of the figure), which is loose at the outer edge of the piston D, and is kept pressed against the periphery of the cylinder by two springs R, and similar bars at the sides are thrust outwards by springs Z. In order that the pressure of the packing bars against the cylinder may be uniform at all speeds of the drum, the centrifugal force acting on the bars is neutralised by means of double-armed levers S, which engage the bar Q and a weight T movable in the piston.

The annular gap at each end of the cylinder, between it and the drum, is packed by means of a transversely split ring V (of U-shaped cross section) sprung upon the drum B. It is only capable of radial movement in a groove in the cylinder, and its U channel is used to carry the balls W. These details are clearly shown at the left corner of the figure.

Another American Design.

The supplementary fan N may be dispensed with if scavenging is intended to be dispensed with.

A similar but simpler design is shown in fig. 7, the invention of an American. The design, it will be seen, reproduces a feature of the eccentric vane pump, with the vanes held in contact with the cylinder by coil springs. There are diametrically opposite blocks in the casing having inclined faces which control the inward and outward movements of the wings, and also form fixed walls of the expansion and compression chambers. One of these blocks is provided with a compression port, and the other with an exhaust port. A compression storage chamber is arranged in receiving communication with the compression port, and a by-pass leads from the storage chamber to the expansion chamber. This type of prime mover may be developed for automobile purposes.

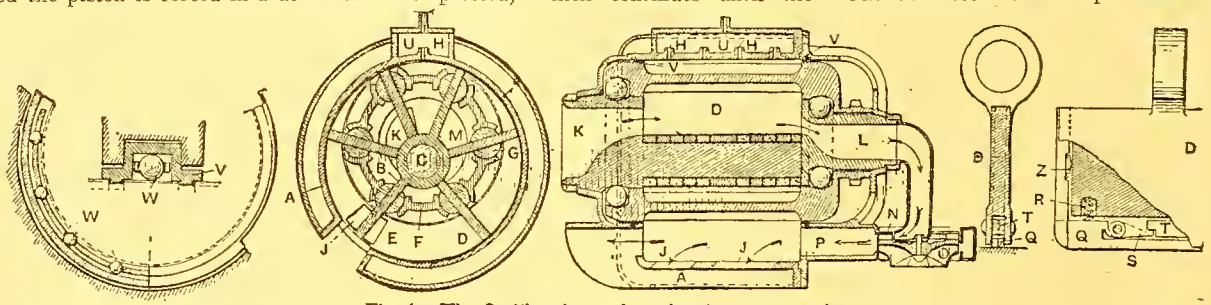


Fig. 6.—The Oerlikon internal combustion rotary engine.

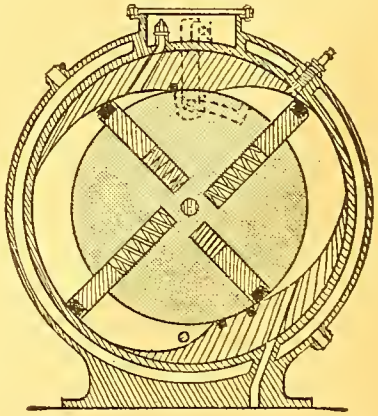


Fig. 7.—An American rotary engine.

When the story of the war comes to be told in detail, one of its most fascinating side-issues will be that of the part played by the

TRIUMPH

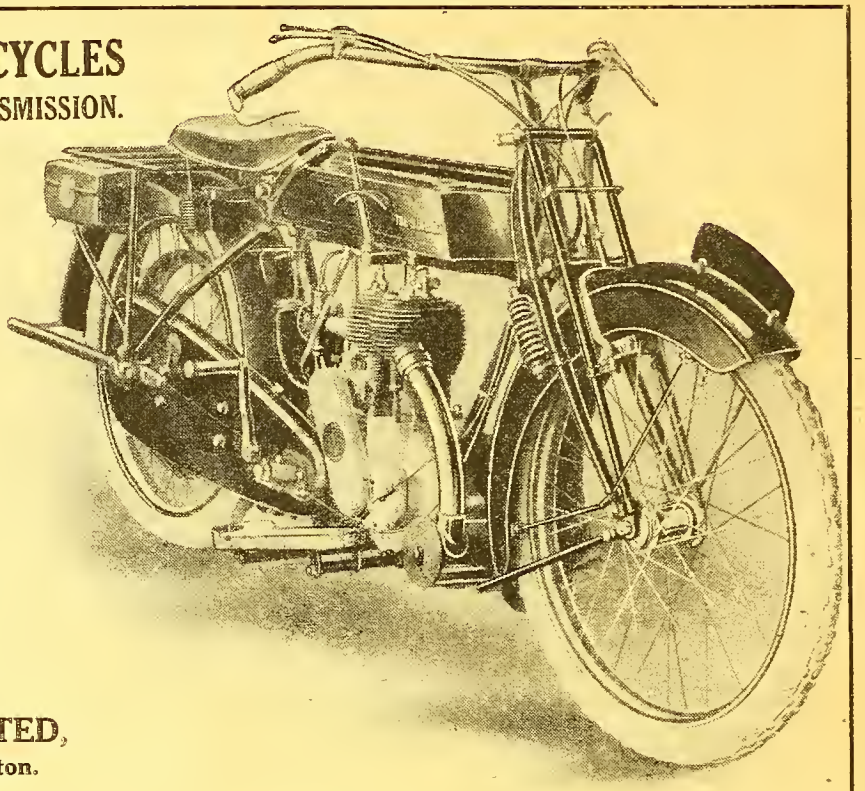
MOTOR CYCLES.

Our whole output has been at the command of the Allied Governments since hostilities began. The trusty TRIUMPH has successfully withstood the cruellest conditions which modern war has imposed. In the delivery of despatches, in bringing machine-guns into position for action, in a hundred different ways the TRIUMPH has time and again proved worthy of its name and reputation.

TRIUMPH CYCLE CO., Ltd.,
COVENTRY.

SUNBEAM MOTOR CYCLES
WITH PERFECT POWER TRANSMISSION.

The Best Motor Cycle before the War—during the War—and after the War.



AT the present time SUNBEAM MOTOR BICYCLES can only be supplied under a Ministry of Munitions permit, but the Makers have a waiting list for those who desire priority delivery when conditions become normal.

Further particulars will be sent on application to ——

JOHN MARSTON, LIMITED,
11, Sunbeamland, Wolverhampton.
London: 57, Holborn Viaduct, E.C.1.
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SATISFACTION — Matchless "J·A·P"

KNOWN ALL OVER THE WORLD — ROYAL ENFIELD "J·A·P"

POWER — "J·A·P" Morgan Runabout

RELIABILITY — The "Bat" "J·A·P"

British "J·A·P" and Best ENGINES

SILENCE — The SUNBEAM "J·A·P"

ROYAL RUBY "J·A·P" ECONOMY

ZENITH "J·A·P" SPEED

A powerful, sweet-running engine contributes largely to the pleasure of your motoring. The post-war J.A.P. sidecar engine will stand out unique among all others for its Power, Silence, and Flexibility. It is the outcome of years of previous experience, coupled with the most up-to-date design and choice of materials.

Manufacturers of machines with a reputation realise the qualities of the J.A.P., and know that to fit them will ensure complete satisfaction. It is to your interest to study only machines fitted with the famous J.A.P. engines.

The J.A.P. booklet, describing any model, may be had on application

J. A. PRESTWICH & CO.,
Northumberland Park, Tottenham, London, N.17

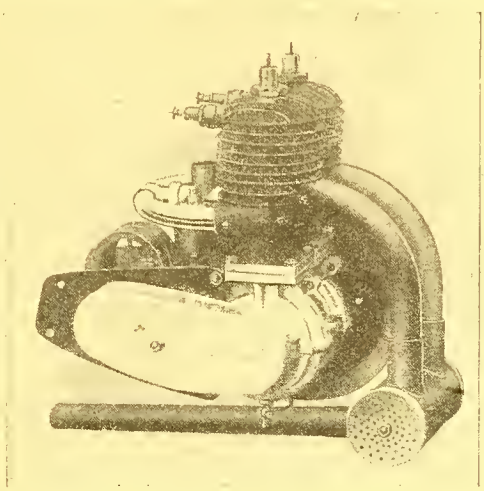
THE SIDE-BY-SIDE TWIN.

A 1912 Levis Twin of Exceptionally Neat Design.

IN our issue for June 6th we illustrated sixteen different models of side-by-side twin engines of the two and four-stroke types. This article probably was the most comprehensive collation of such engines that has been published. Nevertheless, we find we omitted one engine which should have been included, and illustrate it here.

This is the little Levis engine, produced in 1912 and exhibited at the Olympia Show of that year, but, we understand, it was not marketed owing to the demand for the popular single-cylinder model being more than the output facilities of the Levis works.

As will be seen from the illustration, this twin engine was exceptionally neat, the cylinders being 58 × 66 mm. bore and stroke, which gave a total capacity of 348 c.c. We recall that, at the time, the interested public were inclined to think that this engine was merely two of the small Levis engines connected together, owing to the use of a crank case which apparently consisted of two single-cylinder crank cases. This is the common practice in America, where hundreds of thousands of small single and multi-cylinder two-stroke engines are in use in motor boats.



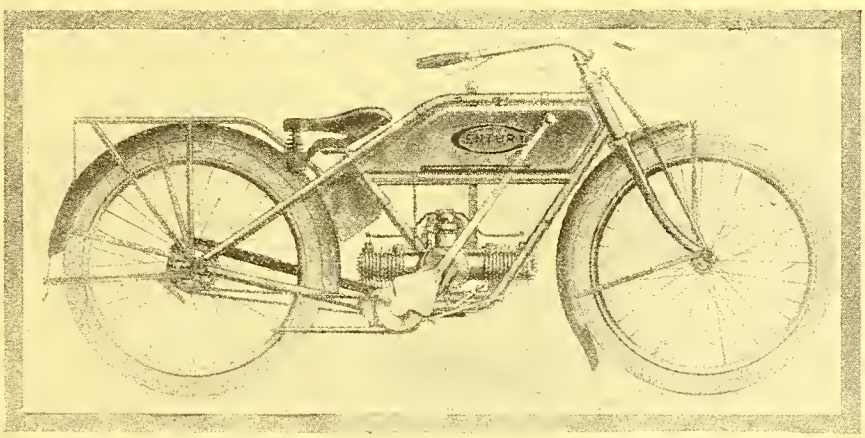
The side-by-side Levis two-stroke twin. The cubical capacity is 348 c.c.

In the case of the Levis, however, it was a model quite distinct from the other two engines manufactured at that time by Messrs. Butterfields. The 2¼ h.p. engine had a cylinder 62 × 70 mm., 211 c.c.; the 2½ h.p. size 70 × 70 mm., 269 c.c.; while, as before mentioned, the twin had 58 × 66 mm. cylinders.

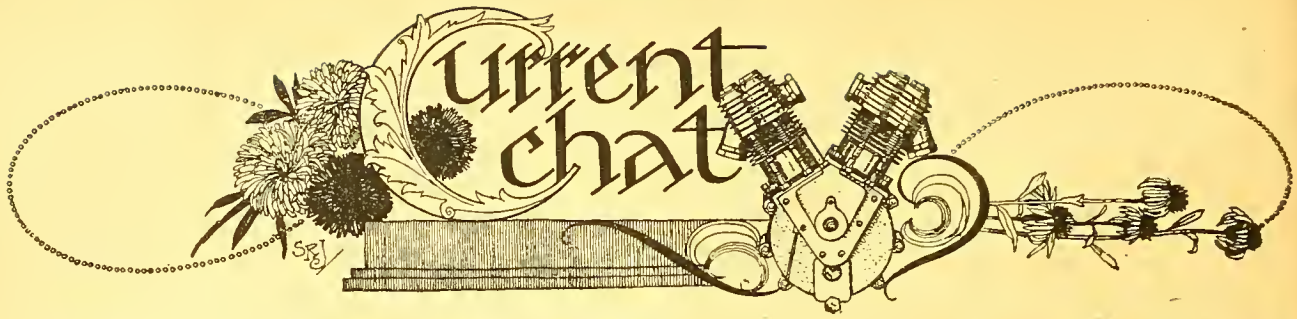
The twin-engined Levis was a very neat little machine, and, we may imagine, would meet with favour from a large number of motorists who require a light handy mount with the torque of a four-cylinder four-stroke engine. As far as the Levis is concerned, however, this type of engine is not likely to figure in the post-war programme of its manufacturers. Since the side-by-side Levis was produced, the firm has experimented extensively with a flat twin two-stroke, which has several advantages over the side-by-side type, including a more perfect balance, and consequent lack of vibration. While the firing effect of the side-by-side type is the same as a four-cylinder four-stroke, and the flat twin two-stroke only the same as a flat twin four-stroke in this respect, it is regarded as of greater importance to have the inherent qualities of the flat twin.

"REVS" AND POWER.

"REVS" and power usually go hand in hand, and therefore it is the engine designer's one aim to make his reciprocating parts as light as possible in order that his engine shall attain higher speeds. This is one of the reasons why most designers of standard two-stroke engines have not departed from the conventional piston with curved baffle. It is lighter than any other form of piston which can be used in a two-stroke engine. It is interesting to note, however, that one of the most successful two-stroke engines from a power standpoint was one which embodied an exceptionally heavy piston. This was the Koechlin, produced at Courbevoie (Seine), France, in which the pistons were of the trunk type, and, in addition, carried a sleeve extending above the piston top. It is on record that a four-cylinder engine of this make, with cylinders 85 × 186 mm. bore and stroke respectively, developed 110 h.p., also that a car fitted with an engine of this type, despite a heavy handicap, finished tenth in the Grand Prix a few years ago.



The American Century flat twin two-stroke motor cycle, probably the only machine of its type to be marketed. A comprehensive article on the flat twin two-stroke engine was given in the issue of June 20th.



Times to Light Lamps.

SUMMER TIME.

July	4th	... ...	9.47 p.m.
,,	6th	... ...	9.46 ,,
,,	8th	... ...	9.46 ,,
,,	10th	... ...	9.44 ,,

Humber Charities.

As a result of various meetings, etc., the Humber employees have now raised £595 for the Coventry and Warwickshire Hospital, and the works manager (Mr. A. H. Niblett) made the amount up to £600.

Motor Cyclists and the Round-up.

The "round-up" in the London area recently must have been effective, and military and civil police were also stopping all motor vehicles on main roads, at the Dover Road at Blackheath, Maidstone Road at Eltham, and Sevenoaks Road, Bromley, etc. At the latter places as many as six policemen were engaged, and at times there was a queue of cars, vans, and cycles, lined up. One large open car was detained pending enquiries, and there were sensational reports concerning a motor cyclist stopped at a Kent control.

Explanations!

In the S.E. district several engineers on munition and aircraft work and using motor cycles had satisfactory explanations. A member of the Woolwich Club using a Harley sidecarrier for conveyance of car gear from a London factory was told he could save petrol and use a tram. There was one round-up at Blackheath Hill, and another on the same road, at New Cross—one mile away—and six police at both places!

The Industrial Reconstruction Council.

The work of the I.R.C. is expanding so rapidly that it has been found necessary to secure better office accommodation, and the address of the organisation is now 2 and 4, Tudor Street, E.C.4.

The work has been reorganised and divided into sections superintended by sub-committees. Mr. Ernest J. P. Benn remains chairman and administrative chief; Sir Alexander Roger is in charge of the membership section; Dr. William Garnett and Mr. Emil Davies control meetings, and Sir Herbert Nield, K.C., M.P., is Parliamentary representative.

The Council is extending the work of propaganda through other organisations, and is prepared to send speakers to any societies to lecture or initiate discussions. Applications should be made to the secretary, who will gladly supply literature for distribution.

Alcohol from Carbide.

A large plant, said to be capable of producing 100,000,000 kilogrammes (approximately 28,000,000 gallons) of alcohol per annum from carbide (or, more correctly, acetylene) is being erected by a Swiss company at Visp. The catalytic process of manufacture is described in the German journal *Vorwärts*.

Gas Companies and Benzole.

By an Order in Council recently published all gas companies are compelled to extract all benzenes from their coal instead of letting them pass into the gas. This means a lowering in the calorific value (or heating and illuminating power) of the gas, but the supply of the raw materials for explosives is at the present time more important than the satisfactory working of gas stoves in houses and works.

Will anyone succeed in convincing the Government that the same will be true after the war—with *home-produced fuels* in lieu of raw materials for explosives?

Motoring in Australia.

"Business as usual" is still the practice of the motoring community in Australia, and riding goes on as before the war. Nevertheless the situation is beginning to take another aspect, and motorists are being warned to economise before Government action becomes necessary. It is hoped, with some reason, that in time Australia will become self-supporting in the matter of fuel, but that time still lies well ahead.

Special Features.

SOME INTERNAL COMBUSTION TURBINE AND ROTARY ENGINES.

FOUR CYLINDERS AND WATER COOLING.

"To be Continued in our Next."

Our American contemporary *Motor Cycle and Bicycle Illustrated*, having run a successful serial "Bob o' the Wheel," is starting a sequel "Bob Carries On."

Review of the Foreign Technical Press.

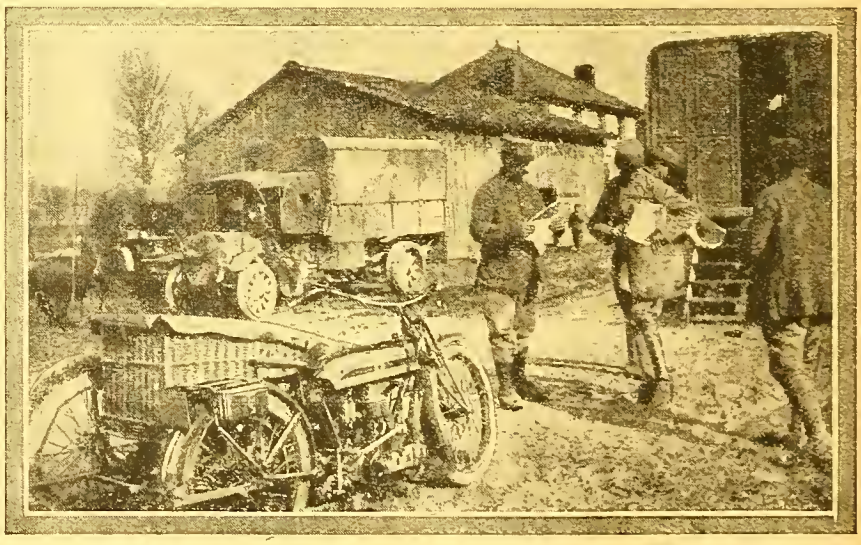
This most interesting and useful War Office publication is now available to all those interested. It may be obtained (price 6d.) from any bookseller or directly from H.M. Stationery Office, Imperial House, Kingsway, W.C.2, 23, Forth Street, Edinburgh, and E. Ponsonby, Ltd., 116, Grafton Street, Dublin.

Some Bargains—any Offers?

What queer ideas different people have as to the value of articles they have to sell or dispose of. In the small advertisement columns of a recent issue a 1911 Douglas was advertised for £38! We should be interested to hear if and for how much this machine was sold.

Another, almost as good, is the following (also from the same issue): "Exchange, two girl's dresses, one silk, one satin, and maid's slate costume, for sidecar, complete."

What *was* the matter that week?



Posting the troops with news. A military "news boy" at the back of the French lines. The motor cycle is a W.D. Triumph with a Gloria basket sidecarrier.

n Switzerland.

By an Order recently issued in Switzerand no motor cycle, either new or secondand, may be sold in that country without permit.

A Real Cycle Car.

There is a vehicle running about an American city which can claim to be of the only type fitting the misnomer "cycle car." This is a tandem bicycle with an Auto-wheel and a double-seated child's sidecar attached.

German Motor Vehicles in Brazil.

When war broke out Rio de Janeiro had a very large stock of German motor vehicles on their market. We hear that these have now been disposed of, and that there is a good demand for a small two-seater car. Why not sidecar combinations?

The Motor Users' Protection Association.

A general meeting will be held on Friday, July 19th, at 2.30 p.m., at Essex Hall, Strand, W.C., when the question of a new title, "The British Motor League," will be discussed. A booklet entitled "Motoring for the Million," containing the rules of the Association, has been issued.

Petrol Scarcity in Sweden.

Great scarcity of all petroleum products exists in Sweden owing to the curtailment of supplies from America. At one time Germany received deliveries of petrol and petroleum products from Sweden, but the entry of the U.S.A. into the war has resulted not only in the cessation of this "leak" into enemy countries, but has made Sweden wish she had kept in stock the petroleum she sold to Germany earlier in the war.

Petrol from Trinidad?

Petrol, lubricating and fuel oils, and kerosene are now being refined in the island of Trinidad, where upwards of a thousand motor vehicles are in use.

To Drill for Oil in England.

The American oil press reports that a British company has recently been engaging oil men in the States to proceed to England for the purpose of drilling what are termed "wild cat wells for oil." Whether the words "wild cat" are used in a derogatory sense or merely signify something of a speculative nature is not clear from the context. It is stated that some of the workers are already in England.

At the Seaside.

"The sea front is not what it used to be," writes one of our contributors from the South Coast. "No disc-wheeled, rakish speed machines muttering up and down the esplanade all the morning nowadays. Apart from the ubiquitous P. and M. (which I can never think of as a pleasure machine again!), I have seen one Baby Triumph (why *does* the twenty-stone rider of multiple chins always plump for a tiny two-stroke?), one Douglas bestridden by a clergyman, and obviously in horrible tune, one stone age Bradbury with sidecar and two 'specials' up, and that is all, unless you count the power lawn mower at the park, now running decorously under a gas canopy.

"The garages, though, are crammed with serviceable mounts: I noticed in one place a fleet looking little 3 h.p. M.A.G.-Matchless, an 8-10 h.p. Bat, two Nortons, and a dusty Henderson, all resigned to the fate of Rip Van Winkle, all resting mournfully on their flat front tyres, their owners—who knows where?"

Annual Meeting of the A.A. and M.U.

The annual meeting of the Automobile Association and Motor Union is to be held at the Savoy Hotel, W.C.2, on July 10th.

Outings for Wounded Soldiers in South Africa.

These are still going strong, but apparently there is a fly in the amber—the motorists will not turn up to time. And so prizes are offered, in some clubs, for punctual attendance on the part of members!

Sidecar Springing.

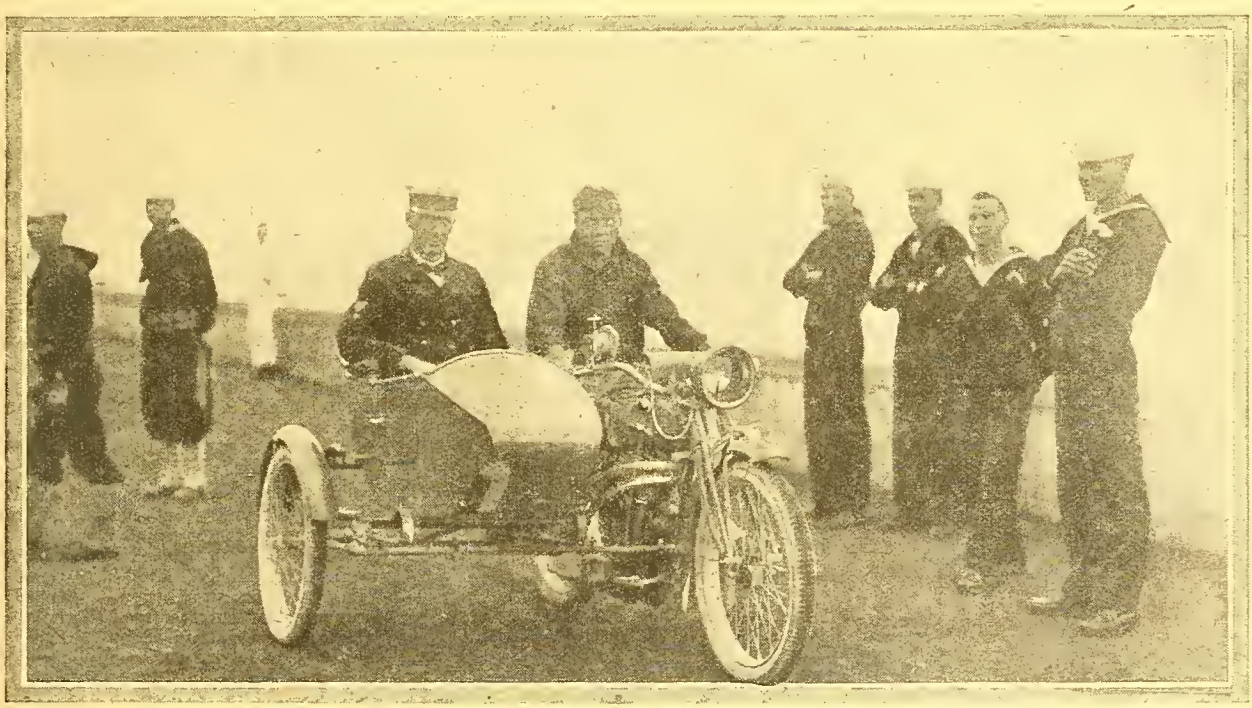
Some of our learned armchair designers say that springing the sidecar wheel is unnecessary, and is based on fallacious reasoning. We hope to publish shortly an article by "Chinook" describing his experiences as sidecar ambulance driver in the Vosges. The article contains some very pointed criticisms of present sidecar springing, but the criticisms are not merely destructive and unreasoned. "Chinook" suggests a system of his own for body springing, and perhaps some designer may spare a moment to consider it.

Carrying Wounded.

As "Chinook" says to the designer: "Imagine yourself carrying a partly disembowelled man in a sidecar with no real springing and board-hard tyres. It is not merely a matter of comfort, or even of avoiding human suffering; it is often a matter of human life."

Tyres.

"Chinook" also has something to say on the question of under-sized tyres—a matter on which we have an article in hand.



With the American Navy in British waters. An Indian outfit being used for the purpose of conveying despatches.

MILITARY NOTES.

Pioneer Tankers and Despatch Riders' Repair Kits.

WITH THE EARLY TANKS.

WE reproduce below a photograph of Pte. Hewitt, who was one of the first twenty transferred from the M.M.G.S. to the Tanks, and Pte. Jacks, R.F.C. Both were recruited through *The*

Pte. Hewitt, Tank Corps (reclining), and Pte. Jacks, R.F.C.

Motor Cycle, and were enthusiastic motor cyclists before the war. They are at the present time convalescent at a London hospital.

FROM A MACHINE GUNNER.

PTE. GODSELL, writing from France, says: "I cannot understand the feeling between the A.S.C. and other corps; some sections of the A.S.C. are non-combatant with pay at 6s. per day—good luck to them. In some cases the money was the magnet, and I sometimes wish I had joined it, but went as a machine gunner at 1s. 2½d. per day instead. Now in the Armoured Cars some of the drivers get 6s. per day, others 2s. 4d. per day. But are we not all combatants of the same degree? We all go into action together and take the same chance. Although there is no feeling between us, we have been puzzled, but we see no reason why there should be jealousy. Some one must have the cushy jobs, but it certainly would look better if the wages were standardised."

D.R.'s IN EAST AFRICA.

CPL. S. DU ROSE, writing from East Africa, says: "The boys along with me out here eagerly look forward to the batch of *Motor Cycles* which we receive through the irregular post.

"B.S.A.'s are the only bicycles that can stand the sand and mud of the chronic 'roads' up the line in German East Africa. Douglases and Triumphs are used in the towns where there are fairly respectable roads, but they cannot 'plough' like the B.S.A.'s.

"Hurry with 'your' war in Europe, and get it over, so that we can return to our own mounts and the good old Blighty roads."

PETROL FOR SAILORS AND SOLDIERS ON LEAVE.

WE are continually receiving requests for information on the granting of petrol to sailors and soldiers on leave. Petrol is granted to registered owners of motors on which the local taxation licence has been paid, or to those who have a near relative owning a machine which they are willing to lend to the applicant.

Application for the licence should be made to the Petrol Control Department, 19, Berkeley Street, W.1, about three weeks before it is required, or, if this is impossible, personal application is advisable. Licences are only issued to men on leave after either service Overseas or treatment in hospital.

TANKS DURING THE GERMAN OFFENSIVE.

A WAR correspondent with the French Army recently said that one of the great counter attacks carried out by the French during the German offensive was notable on account of the co-operation of the Tanks in large numbers. The long line of Tanks with infantry marching between them was an impressive sight. One observer compares these lurching monsters with groups of men around them to a line of cruisers in a heavy sea with their attendant small craft around them, and says they gave an excellent account of themselves.

Air mechanics of the Transport Section attached to the Balloon Section of the Royal Air Force. The motor cycles, it will be observed, are P. and M.'s.

Pte. W. C. Winwood, who joined the M.M.G.C. early in the war, afterwards transferring to the Tanks. He was wounded in 1915, but returned to France and was posted as missing in November, 1917.

D.R.'s' DANGER AND A CURIOUS CAUSE OF MISFIRING.

SAPPER W. P. PERRINS, taking exception to some of "Venus's" statements, says:

"I should like to say, in reply to 'Venus' in the issue of June 20th, that I do not quite agree with his statement with reference to R.E.'s anywhere between Rouen and the Corps Headquarters. He omits the fact that at every Divisional Headquarters there are from ten to twelve R.E. D.R.'s stationed, to run to brigades, etc. In my own case, before being wounded, I was allotted to a battalion of the Tank Corps, which is forward of the heavy artillery. I was by myself with a Douglas, and the only tools I had were a crown cap spanner, valve extractor, and a pair of pliers. My spares were one exhaust and one inlet valve complete, one chain, one belt, and one plug. If I wanted any repairs done I had twenty-five kilos ride to Brigade (Tank Corps).

"Whilst writing, I should like to mention a curious fault I had on the Douglas—namely, frequent misfiring in the rear cylinder. I tried the plugs, changed them over, but with no better results. I ground in the valves, and made several other adjustments, but eventually traced the trouble to a small hole in the vulcanite of the carbon brush holder, which, I concluded, allowed part of the current to leak away through the body of the magneto. Having filled the hole with rubber solution and bound with thin rubber tape, I tried the machine, and was pleased to find it no longer misfired.

"I might add that all the time I was in France I had a copy of the 'Blue 'Un' sent to me every week. I wish the old paper every success."

THE MOTOR CYCLE

AVIATION SECTION

Aeroplane Production.

Mr. Kellaway's reply to a question on aircraft production asked by Mr. Joynson-Hicks in the House of Commons last week was to the effect that the delivery of aeroplanes for the three months of March, April, and May, 1918, were 116% in excess of the deliveries during June, July, and August, 1917, while the excess in the delivery of engines was 105%.

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Dangerous 'Planes.

Mr. Joynson-Hicks in the House of Commons last week spoke about a particular make of aeroplane denounced as dangerous many months ago, which was practically obsolescent and which would be replaced by another well-known make of machine. Major Baird said the value and reliability of this machine had been demonstrated in the field, and it is necessary to maintain its supply until newer types can be produced in sufficient quantities.

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Vague.

"How many aeroplanes are now in stock waiting for engines, and when is there any hope of engines being provided in sufficient quantities to utilise these machines?" was a question asked in Parliament last week. The answer given was to the effect that a considerable quantity of aeroplanes are at present in store, but it is not in the public interest to supply the actual number. It is anticipated that all machines at present surplus to requirements will be fitted with engines before long.

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M. Painleve on the Deciding Phase.

In a recent article in the *Petit Parisien* M. Painlève, President of the Aviation Group in the Chamber of Deputies, calls for a new and drastic development of the campaign for the greater utilisation of the aeroplane in the present war. He says it is all very well to talk about aviation deciding the phase of the war, but to arrive at that end the present-day conceptions and plans must be enormously developed.

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The Allies' Aims.

"We may not be able to cross Germany by mere artillery power," writes M. Painlève, "though our artillery has nothing to blush for in comparison with the enemy's, but we have developed aviation to that stage where we can at least count on blinding the enemy's guns. The superiority of our aviation is undoubted, but we must have legions of aeroplanes to multiply the victories we have already achieved."

Fighting Value.

The fighting value of aeroplane engines produced during the last three months is very much higher than that of those delivered for any previous three months of the war.

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Air-cooling of Big Engines.

Not many years ago the 4½ h.p. Bradbury motor cycle engine of 89 mm. bore was openly discussed as approaching the limit size for successful air-cooling. We have nearly doubled that bore in 1918, but the cylinders are not all cast iron.

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Over-cooling.

There is no trouble in keeping the largest air-cooled aeroplane engines cool. Indeed a famous designer told us not so long ago that he at first "over-cooled" his engine, and amended the design of the cylinders as a result.

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Uniform of the Flying Service.

And so the uniform of the Royal Air Force is to be light blue after all. Rumour has it that this sudden reversal of decision is due to millions of yards of cloth intended for Russia becoming available for home use. R.A.F. officers are, however, to be allowed to wear out their khaki uniforms.

Reading tailors have been officially advised not to make any more khaki uniforms for R.A.F. cadets in view of the impending change.

3,000 H.P. Aeroplanes?

What will be the most powerful aeroplane at the conclusion of peace—1,500 h.p., 2,000 h.p., or 3,000 h.p.? The Germans have used bombers of 1,040 h.p.; but it is not likely that British designers will allow our long lead in aeroplanes to be lost.

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Defending Paris.

An American escadrille, composed of aviators chosen from among the best American pilots, in the future will help to defend Paris against enemy air raids. Offer of this help was made spontaneously by the Chief of the American Aviation Service, and accepted by the French Government.

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American 'Planes.

A recent statement published in the press from the U.S.A. Military Affairs Committee says that there are now in France 1,316 aeroplanes of American manufacture, of which 323 are combat 'planes. The statement also says there are now complete in the States 3,760 aeroplanes.

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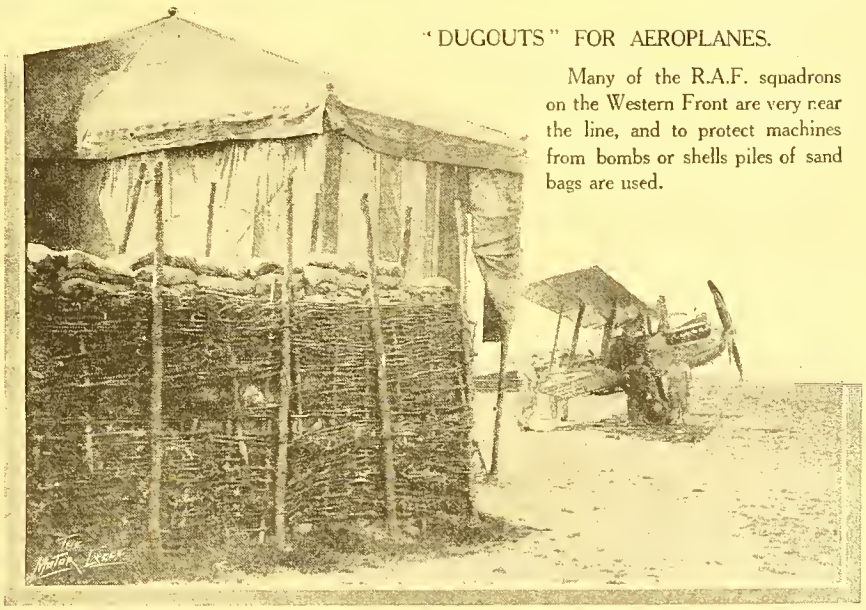
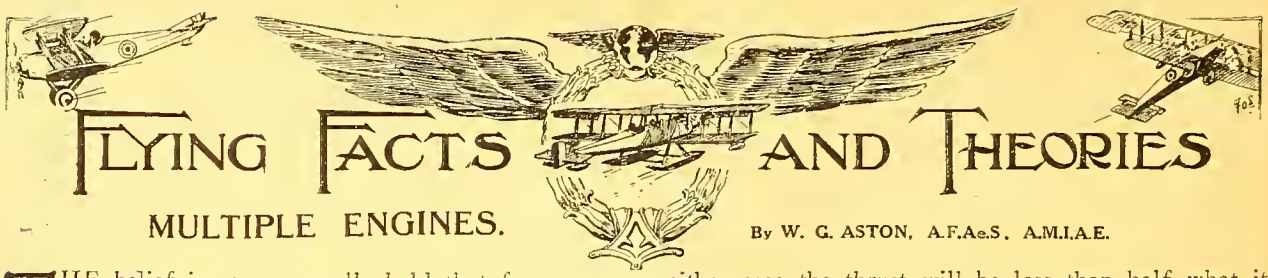
Aerial Mail.

The Air Mail Service has justified its establishment in the opinion of the P.O. officials of the United States. The results achieved so far have been entirely satisfactory, and the continuance of this service between Washington, Philadelphia, and New York is assured.



"DUGOUTS" FOR AEROPLANES.

Many of the R.A.F. squadrons on the Western Front are very near the line, and to protect machines from bombs or shells piles of sand bags are used.



FLYING FACTS AND THEORIES

MULTIPLE ENGINES.

By W. G. ASTON, A.F.Ae.S., A.M.I.A.E.

THE belief is very generally held that for peace time purposes, especially for the large size commercial weight-carrying aeroplane, multiple engines are a *sine quâ non;* this belief is well founded in the fact that two, or three, separate power plants are obviously less liable to risk of breakdown than one—that is to say, of simultaneous breakdown—the actual probability of a mishap occurring to any one of them being in no way reduced. If, therefore, the aeroplane is so designed that it can fly with one or more of its engines either completely or partially out of action, it is clear that the danger of a forced landing is practically obviated. It must not be forgotten, however, that the employment of multiple engines introduces more or less serious disadvantages, which, beyond a certain point, may actually outweigh the advantages. Let us take, for example, the simplest possible case—that of the two-engined machine.

First of all, efficiency must deteriorate on account of added resistance, whether one places the engines on the wings on each side of the central fuselage, or uses two separate fuselages. In the latter case the body resistance is clearly doubled, in the former it is almost certainly more than doubled; but, on the other hand, the system of construction is considerably lighter, and this fact of itself sufficiently accounts for the demise of the double-fuselage idea.

Engines in Line.

The third alternative is to place the engines in line in a single body, making one drive a pusher and the other a tractor screw. This would certainly reduce resistance materially, and would lend itself, *cæteris paribus*, to the minimum weight of structure: but, alas! several complications ensue. The mounting of a tail-fuselage behind the rear propeller is in itself a formidable mechanical problem (although successful aeroplanes embodying this principle have been made in a few instances), and in addition there is this trouble, that one screw must work in the slip-stream of the other. If fixed-pitch screws of the ordinary type are employed, the front one will in all circumstances do more work than that which is behind, provided that the revolutions of both engines are kept the same, and this will especially be the case when the aeroplane is climbing and the efficiency of the leading screw falls off. Either, therefore, the screws must be kept the same and the after engine speeded up faster than the forward one, or else the r.p.m. must be kept even and the aft engine fitted with a screw of greater pitch than the other. In the former case it is evident that if the front engine stops the fullest power of the rear screw will not be available, whilst in the latter case the stopping of the front engine will immediately abolish the slip-stream which the greater pitch of the rear screw is introduced to deal with, hence the rear engine will be unable to keep up its revolutions. In either case the thrust will be less than half what it was before.

If the rear screw be provided with a variable pitch device these objections disappear, and as this contrivance is a perfectly practical proposition the two-engines-in-line scheme is seen to be quite feasible, always provided that the tail mounting can be successfully accomplished.

The value of the variable pitch screw would also, in this connection, show itself in the fact that if either power plant went out of action, either by accident or design, its screw blades could be promptly feathered so as to promote the least possible resistance. One may mention incidentally that the resistance of an idle screw is enormous.

The next point to consider is weight. In this connection it is clear that the two engines in line arrangement is ideal, inasmuch as it allows the engines to be massed closely together, and involves the least possible additional structure. If the engines are put out on the wings, as is the usual practice, considerable extra weight is introduced. This is a bad point, but so long as double-engined aeroplanes are made for military purposes it has this advantage at least—that it interferes to the smallest possible extent with the action of the guns on the machine.

Torque Reaction.

The torque reaction of two engines, if they are made to run in opposite directions, will balance itself however they are mounted in the machine. The same does not apply, however, to their thrust. If they are on the wings, they must be controlled so that their speeds are always the same, otherwise the eccentricity of the thrust will cause the aeroplane to veer in one direction or the other. This can be neutralised by the rudder, but such correction of necessity slightly slows the machine. Again, if one engine ceases work altogether the thrust is so out of centre, and the necessary rudder and aileron correction so great, that the loss in flying efficiency is decidedly material. In point of fact, the aeroplane, in these circumstances, is forced to fly partially sideways. In connection with slip-stream effects the outrigger arrangement of engines is very desirable, as not only is the fuselage resistance reduced thereby, and the pilot and passengers freed from much of the breeze and clatter of the motors, but, more important still, the tail organs work in practically undisturbed air and their effectiveness is not in any way interfered with, whether the engines are on full throttle or not.

It is needless to say that, whilst the above is merely a brief consideration of the two-engine proposition, the points raised apply with equal, or more, force if three, four, or more, power plants are projected. As multiple engines are associated with big machines, the latter will be discussed in a future article.

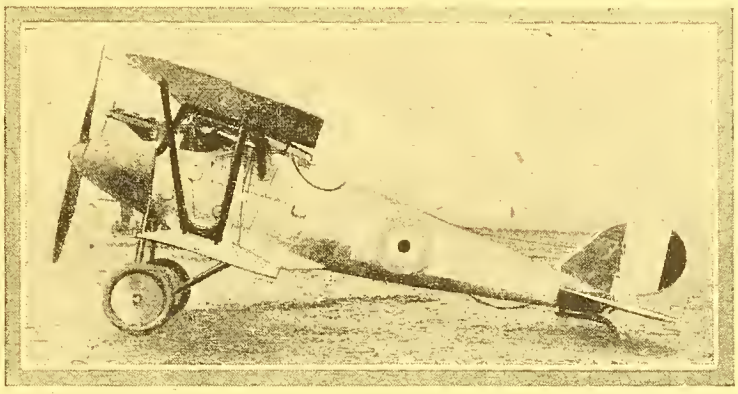
AMONG THE TROPHIES.

The Captured German Aeroplanes at the Agricultural Hall. By R. H. Brittain.

YOU are issued a little buff-coloured pass, and after interminable windings along the dismal North London streets you come to the Agricultural Hall, once the home of live stock exhibitions, the World's Fair, and motor shows, now given up to the display of captured German motors, 'planes, and accessories. A huge policeman hands you over to a munitionette in brown holland overalls, who in turn wafts you across to another of the same persuasion; and after sundry signings of books you are handed a catalogue artistically covered with doped linen, and allowed to wander at large among the camouflaged Agos, Albatrosses, and Pfalzes, which beckon you.

The Albatross, with a 160 h.p. Benz motor (I shall not attempt to be too technical, this side of the exposition has already been fully dealt with, and the knights of the slide-rule have left the ground perfectly barren!), is a clean looking bit of work. She is credited with the not too sensational performance of 98 m.p.h. at 10,000 feet, having attained that height in sixteen minutes ten seconds.

Some of the camouflage is so daring that it is reminiscent of Bakst, or shall we say Max Reinhardt, the German impresario, to be more consistent?



The Pfalz aeroplane, a German production. One of this type of 'plane is on exhibition at the Agricultural Hall.

The Rugged Benz.

The 220 h.p. Benz is one of the outstanding exhibits; with her six hefty vertical cylinders and her normal b.h.p. of 230 at 1,400 to her credit, she is the sort of massive, rugged erection that might have been expected of Rodin, had he turned engineer instead of sculptor. The general impression given is one of extreme adequacy to the work in hand, in contradistinction to the woodwork of the German 'planes in general. The engine suggests a much greater weight than that given—848 lb.—but this is largely due to the stout valve gear (four valves per cylinder) which caps the cylinders with their 7.48in. stroke. A singularly complete set of sectioned parts is shown by each engine.

This principle is followed throughout, half of each wing of the 'planes being stripped to show the internal arrangement, the other half being left as finished.

The 160 h.p. Mercédès seems a pigmy in comparison. Her general layout is smoother, and her makers content themselves with the normal complement of valves. Her piston heads are concaved, as against the convex top of the Benz—but I said I would not be technical! It is interesting to note the substitution of iron wire for copper, and paper insulating medium for rubber, in the high-tension cables. These little things are indicative!

The machine gun and interrupter gear of the Albatross is shown—as pretty a bit of lethal work as could be devised. Here is a baby anemometer, cheek by jowl with an oxygen set that might have been produced by Heath Robinson. Further on we are brought up sharply by a ferocious dummy rigged out in the suit of an aviator whom death overcame suddenly—"somewhere in England." He must have been a huge man, and his effigy, with its trouser buttons for eyes and red paint gash of a mouth, towers over one. The cloth is of poor quality, lined with kapoc, and the waist is wrapped round with a variant of the domestic hot-water bottle. Evidently the Huns still manage to supply their Services with fairly adequate clothing, even if their civilians go lacking—doubtless you have heard the delectable tale of the German lady with the paper chemise, which disappeared in the wash-tub?

The D.W.F. Aviatik follows the usual German principle of construction—masses of poor quality, rough-hewn timber, thrust through space by a thumping great engine, in this case a 220 h.p. six-cylinder Benz. The commonest fir is impressed into service, so it does the job. Probably there is no choice. Especially is this the case on the Gotha, the aspect ratio of which would hardly bear calculating, but which has an unhappy knack of getting there, as most of us can testify!

Deal and Rusty Nails.

All this section shows evidence of hurried, but perfectly adequate workmanship. In some instances laminated strips are tacked on to spars with common iron brads, the points being turned over and clinched on the other side. The effect of these rusty nail points suggests an ill-soled boot. Rough spars of deal, four square to the wind, how they would stun an A.I.D. inspector, should such a one be asked to pass them—yet, powered by such engines, what do they not do? We may jeer at the work, which reminds us of our earliest efforts at carpentry (that soap box you made, and got scolded for notching the kitchen chair with your saw!), but the lesson is forced on us that all that matters is the "getting there," and in war-time at least there is such a thing as "too good."

Motor cyclists who are engaged in aeroplane production should certainly write for passes to C.T.D., Central House, Kingsway, W.C.2. The exhibition is interesting, not only for the insight it affords into enemy design and construction, but also for the demonstration of resource manifested under difficulties not unconnected with the work of "the silent Navy."

An Engine within the Propeller Boss.

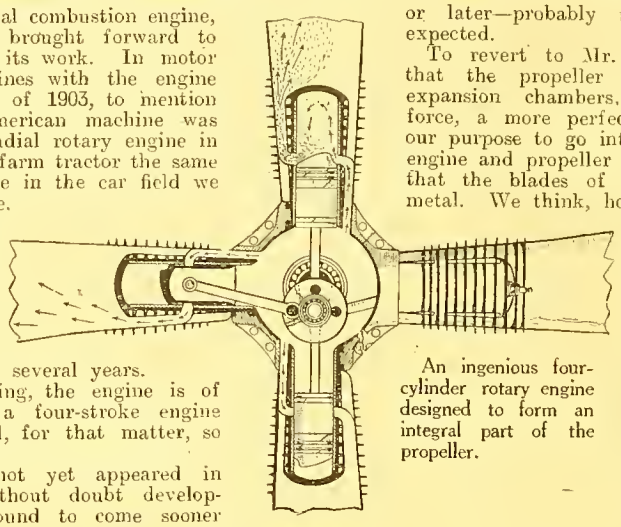
An Interesting Design incorporating a Self-contained Aeroplane Power Unit.

SINCE the advent of the internal combustion engine, many inventions have been brought forward to bring the power unit near to its work. In motor cycles we have had several machines with the engine inside the rear wheel—the Singer of 1903, to mention one—while only recently an American machine was produced with a three-cylinder radial rotary engine in the same position. In the heavy farm tractor the same objects have been aimed at, while in the car field we have had engines in the back axle.

We now have particulars of an aeroplane engine within the propeller boss. It is the invention of Mr. W. H. Jones, who is in the R.N.A.S., but who, unlike many of his colleagues in the R.A.F., has taken a keen interest in aeronautical matters for several years.

As will be seen from the drawing, the engine is of the two-stroke type, although a four-stroke engine could be used equally well, and, for that matter, so could any number of cylinders.

The two-stroke engine has not yet appeared in "standard" aeroplanes, but without doubt developments along these lines are bound to come sooner or later—probably sooner than may generally be expected.



An ingenious four-cylinder rotary engine designed to form an integral part of the propeller.

To revert to Mr. Jones's design, it will be seen that the propeller blades are utilised as exhaust expansion chambers, and, owing to the centrifugal force, a more perfect scavenging results. It is not our purpose to go into the constructural details of the engine and propeller beyond saying that it is intended that the blades of the propellers be constructed of metal. We think, however, that Mr. Jones is a little before his time, but while, at the present time, there may be several obstacles in the way of the success of an engine of this type, the future may remove such obstacles, and so make the combined engine and propeller the accepted practice in the future.

The invention suggests the possibility of carrying exhaust pipes from "conventional" rotary radial engines through the propeller blades, which would be an intermediate stage towards Mr. Jones's ideal.

ELECTRICALLY HEATED CLOTHING.

How British Pilots are kept Warm at High Altitudes and when Flying at Night.

OUR airmen who have to protect the Metropolis from air raids, and have also to carry out offensive expeditions against the enemy Overseas, have naturally to take special precautions against the intense cold with which they have to contend at high altitudes, and it is common knowledge that they employ electrically heated garments to keep them warm. We imagine that electrically heated clothing would be considered quite a novel invention by the ordinary reader, but it is an interesting fact that Col. R. E. Crompton, C.B., R.E., in conjunction with Mr. H. J. Dowsing, M.I.E.E., took out a patent in 1894 which covered the warming of fabrics by electricity. It is, however, only in modern times, when special methods have to be adopted to overcome intense cold, and under conditions in which electrical current is readily available, that the idea has been perfected.

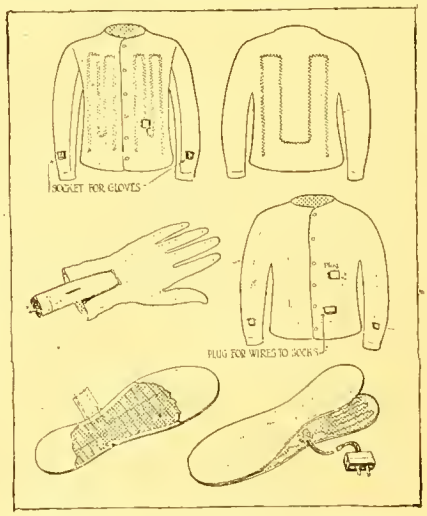
The Source of Current Supply.

It is, of course, quite easy to drive a twelve-volt lighting dynamo from the shaft of an aeroplane engine, and most aeroplanes are equipped with some sort of electrical installation for the purpose of illuminating navigation lights, inspection lamps, and so on; consequently, the current is also at hand for the purpose of heating.

Two methods are employed for leading the electric current into the pilot's clothes. One is to use suitably insulated flexible nichrome wire—a material which is suitable for withstanding great heat, and is crimped or corrugated so as to increase the resistance, and is distributed evenly throughout the whole garment. The other method consists of four separate heaters made of flat nichrome wire wound on a mica strip and carried to prevent injury between two further mica strips, the whole being enclosed in a fibre case. These heaters are inserted in three pockets of the pilot's garments—two in front of the waistcoat and one at the back, and are connected to the main source of current.

Hands and Feet Separately Warmed.

The special electrically heated gloves are composed of thin material and are fitted with very flexible wires, the presence of which is barely noticeable. They are intended to be worn under gauntlets, so that if the gauntlet be withdrawn the aviator may use his hands without the slightest difficulty for the purpose of manipulating levers or switches. A similar process is also adopted for inner socks worn in the boots. Both the gloves and socks are suitably connected to the main source of electricity.



Showing method of wiring the electrically-heated waistcoat, a glove, and a pair of socks.

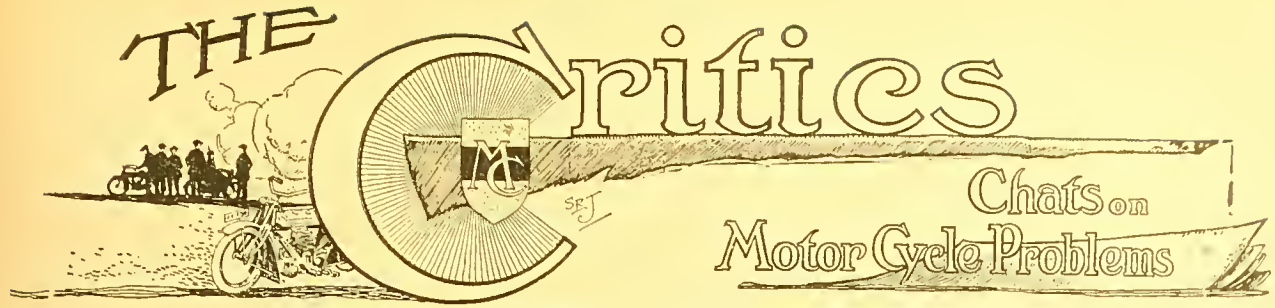
The current consumed amounts to thirty watts for the waistcoat, nine watts each for the gloves, and twelve watts for the socks.

On the occasion of our visit to the Dowsing Radiant Heat Co., Ltd., which supplies these special garments to the R.A.F., Mr. H. J. Dowsing himself demonstrated one of these waistcoats, which, by the way, are made by Messrs. Alfred Dunhill, Ltd., and it was only about two minutes after the current had been switched on that the garments were radiating a pleasant warmth, which we can well understand would be of the greatest comfort to those who have to fly by night at great altitudes. Mr. Dowsing's designs were modified in accordance with the views of officers in the R.N.A.S.

On first viewing a Handley-Page in its shed one gasps. The size of everything is so striking. The throttle levers themselves are as big as the change speed levers on light cars!

After visiting the pilot's quarters, we walked through into the "cabin," and inspected the egg racks. Very formidable they looked, too; but perhaps it had better not be stated how many eggs this hen can lay. The sighting and dropping facilities are very neat.

Dropped down through a trap-door, one finds oneself on the ground just behind the undercarriage, which is quite big enough to enable a man to walk upright under the planes. The engines themselves are placed in beautifully streamlined "eggs."



Concerning Journalists and a Dangerous Topic.

"SOME time ago," observed the Novice, "a writer in *The Motor Cycle* let loose a somewhat scathing criticism concerning American machines. It seems to me somewhat strange that a motor cyclist of experience, as a regular contributor to that illustrious journal inevitably must be, should indulge in such an outburst unless it was to some extent justified. Now what I want to know is, Was that journalist right in what he said, and do the people who are always cracking up Yanks make money out of them, or was it a case of bigoted patriotism on the part of the journalist and 'righteous indignation' on the part of the pro-Americans?"

He paused for breath.

Neither the D.R., the Manufacturer, nor the Journalist ventured an immediate reply. "By the way," put in the Journalist presently, "the Americans and the pro-Americans hate the term 'Yanks.' They have objected to it several times."

"I don't care a straw," responded the Novice, "'Yanks' they are and Yanks they will always be so far as motor cyclists are concerned. It is short. It is convenient. The idea of the Americans objecting to brevity kind of hits me where I live."

"These journalists have a way of disagreeing with themselves and with each other," ventured the Manufacturer, referring to the previous subject. "I recollect that another writer, 'Ixion,' forsooth, disagreed with 'Chinook' on the subject of American machines three weeks later, but it is quite possible 'Ixion' will be damning Americans and 'Chinook' praising them ere we go to press. Anyway, that is neither here nor there. Personally, I have no use for American motor cycles. I would not go out of my way to damn them—each man to his tastes—but I simply steer clear of them."

"Because you are a conservative British Manufacturer," put in the D.R.

Tempora Mutantur.

"I think a great many people are influenced in their judgment by past and out-of-date experience of American machines," observed the Journalist. "As for journalists disagreeing with themselves and with one another, that is because times change, and motor cycles change with time. See here, you do not realise what the motor cycle journalist is up against! One year a criticism may be true; the next year entirely false. Besides which, a conscientious man writes about machines as he finds them. 'Chinook' may have been unhappy in his experience with Americans, or particular points in their design may be displeasing to him. That"——

"That," interposed the D.R., "is no earthly reason why he should attempt to prejudice the opinions of other people by publishing his isolated experience."

"I think," said the Novice, "that where he went wrong was in criticising American machines as a whole, forgetting that only three or four of the best are known to the British motor cyclist. Overseas riders have wider experience, but many of 'Chinook's' criticisms were unjust as concerns the popular American makes known over here, and naturally we are not interested in the weaknesses of machines we cannot buy."

"Well, then," growled the D.R., "why didn't the editor put a glaring sub-title, 'This refers only to machines you can't buy.' 'It doesn't concern you in the least,' or something of that sort?"

"Because it was not an editorial effusion, silly ass!" explained the Novice. "Since it was signed it was obviously a personal opinion. If the author brought heaven and earth tumbling over his ears, that was his show. 'Ixion's' comment on American machines was really just. He said, practically, that they used to be rotten, and shed their little twiddly bits all over the place, but that to-day most of these old weaknesses have vanished, and that the best Yanks are excellent propositions in every sense of the phrase."

Price and Power.

"They may be," observed the Manufacturer, "but their only recommending features are their price and their power. A man is heartily pleased with his Yank when he compares it with Britishers of much lower power. It will pull a high gear, and normally ticks over at a low rate of revolutions, so that it does not shake itself to bits. It is silent, both as regards mechanical silence and exhaust. The power unit is well finished and well balanced, but it is no better than a British power unit of the same c.c. Moreover, the power unit is only one item. The best of engines is valueless unless the machine throughout is up to the same standard. We have all had experience, no doubt, of good engines in rotten cycles—beastly experience! The transmission is equally important. Now tell me this. Is there an American motor cycle the cycle parts of which, also the frame, and the transmission, can compare with such machines as the Lea-Francis, Sunbeam, P. and M., and half a dozen others I could name?"

The D.R. thought a moment. "Perhaps not," he grudgingly admitted, "but there is very little in it. In the case of big twin engines, they have beaten us every way. I could name several of the *best* British engines which consist merely of a number of rough and unfinished castings. No attempt whatever is made at internal finish, whereas the American engines I know are not only machined throughout as regards their minor parts, but they are polished. That indicates a degree of thoroughness the Britisher seems to regard as needless."

"Well," sighed the Novice, rubbing a bristly chin, "I would gladly forego American plating on the timing wheels if I could have British plating on the handle-bars. For heaven's sake, keep off plating and kick starters if you want the Americans to win."

"It's not a matter of winning," grumped the D.R., who was in a growling mood. "We simply want to arrive at a just and sane conclusion. I agree that the Yanks may be inferior to us in their cycle parts, but I say that their machines—the best, of course—are thoroughly good throughout, and that their big twin engines are better than ours."

Size and Power.

But the Journalist shook his head. "I think it is only because they are bigger, and therefore able to run at lower revs. and on lighter load," he said. "Their internal finish may be good; so it is in the best of British engines, though I admit that this is a point on which British makers might expend more time and trouble. Again, you must remember that the big V is a speciality in America; with us it is not. We are working on different lines. The Americans make a big engine of low volumetric efficiency; it is good for some purposes—deep sand and so forth. We make a smaller and more efficient engine on account of our superlative roads. Now take one of your Yanks and compare it with one of Britain's best, say an 8 h.p. Where does the Yank score? In accessibility? Goodness, no! In durability? Not much! Are its plating and its enamel better?"

"Yes, I *don't* think!" interrupted the Novice.

"You say it is faster and more powerful?" pursued the Novice. "Yes, because the Yanks specialise in powerful machines. We'll give you that point."

"I say that it is better balanced, it is more silent, it is delightful to ride and to handle," the D.R. claimed. "No; you are prejudiced. You are not just. American plating and enamel may be poor; it is a pity. But, see here—you

The Critics.—

get astride an up-to-date American (solo or with sidecar, as you like), and you will be charmed with its running. I tell you, the average Britisher strikes you as harsh and unpleasant after it. I know what I am talking about. Take a big American and a big British sidecar outfit into a really mountainous country, and see which serves you the better."

"I have toured the Alps with a big American, and with an 8 h.p. Britisher," stated the Manufacturer, "and I can give you my unbiassed opinion. I consider that England is no testing ground for these big machines. To give them anything of a gruelling at all, you require a region where you get eight miles of almost unbroken low gear work, with patches of flat here and there, so that you can tell, on changing into high gear, how much power you have lost by overheating. Well, I have done that. The American was the more comfortable of the two—owing to its spring seat-pillar, large wheels, and general lay-out. Neither of the engines overheated in the sense that it lost power. I tell you, the rider in England has no idea how much low gear work a modern engine will stand. He thinks that two miles of it is awful, and he gets off to let his engine cool. Well, it is a fact that the modern engine—Yank or British—will stand ten miles of low gear work straight on end, and if handled decently will lose practically none of its power. But—and this is the point—my American was almost unrideable after two miles of low gear work. With the big engine right between your shins you were simply cooked off the saddle. There was no current of air to carry the heat away, and on a hot summer day it was simply awful. The Britisher, on the other hand, never became uncomfortable. It is a fact. On several occasions I had to get off that American and let it cool down, simply because I couldn't stand the heat enveloping me."

"Climate."

"Got off and had hot coffee or a shave. I suppose," suggested the D.R., quoting "A Knight on Wheels."

"I have had the same experience," stated the Novice. "My American used not only to burn my legs, but it used to melt its own magneto—or, rather, the grease with which the magneto was packed—till it fouled up the armature. Once it welded the magnets to the front wheel mudguard"——

"Let us be just," suggested the Journalist. "The Americans have specialised in the big twin. They have made a good job of it. On certain points they have us beaten; on other points we have them beaten. Even so. If the Americans can come in and obtain big sales over here—well, that is a proof of the merits of their machines. If they can do it, I say *let them* do it. It is good for the British manufacturer: good for the industry generally. Criticism, similarly, is good: and there is no earthly reason why there should be ill-feeling behind it. By criticising and discussing American systems we arrive at helpful and valuable conclusions, which influence our own lines of design more than one might think. All I say is"——

"What did Gladstone say in 1887?" demanded the D.R., which reminded the Novice of a story.

"I have heard it said," he began, "that when Gladstone"——

[Thank you.—ED.]

A 540 M.P.H. RACING WHEEL.

A Gyroscopic Unicycle for which the Inventor makes Some Startling Claims.

By L. M. EDHOLM, NEW YORK.

THERE is now building in America a remarkable unicycle which has a wheel of 14ft. diameter, an aeroplane engine, and a pair of gyroscopes. This, the inventor claims, will be able to travel at the incredible speed of from four to nine miles a minute.

The inventor of the gyroscopic motor-driven unicycle, as it is described on the Letters Patent of the United States, is Mr. E. J. Christie, who has the degree of Master of Science, and was a teacher of higher mathematics in two colleges and one university, though for the past eleven years he has been engaged in original research in Marion, Iowa.

Mr. Christie does not base his assertions on theories alone. He has constructed a working model, 20 inches diameter, and weighing 60 lb. It is driven by an electric motor of one-fifth horse-power and has operated so perfectly that the inventor has no doubt of the equally efficient action of the 14ft. wheel now building. The photograph of the model has some details that will be discarded in the perfected machine; thus, the two side wheels will be done away with. The two gyroscopic flywheels on the main axle are driven by the electric motor at a speed of 3,000 r.p.m., and they so perfectly stabilise the unicycle that it is impossible to upset it.

When at rest the machine leans upon one of its side rims, but when the current is switched on and the gyroscopes revolve, the model unicycle rights itself. Then, at the touch of a lever, it rolls away in a vertical position under complete control of the operator. When tightened, the traction belt from the small pulley on the motor to the large fixed pulley on the axle swings the electric motor forward and upward in the arc of a circle. The weight of the motor being transferred forward and upward, naturally causes the unicycle to move forward.

That the 60 lb. machine will run at remarkable speed, operated by a motor of only one-fifth horse-power, is a fact that the working model has demonstrated. Upon the performance of this model the inventor bases his conclusions, that similar unicycles of larger size are operative provided the ratio of weight to power is not greater than that of the model, which is 300 lb. to 1 h.p. So the model demonstrates that stability and propulsion may be obtained in the unicycle with maximum weight and minimum power.

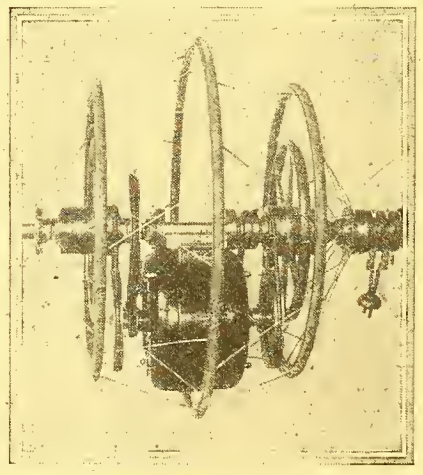
The inventor gives the plans for the man-carrying unicycle as follows: It will have only one rim, and this will be of 14ft. diameter. The motive power is a Heath aeroplane engine of 300 h.p. weighing only 550 lb. This engine will be suspended 5ft. below the main axle, to which it will be attached by roller bearings. It will require only 5 h.p. to spin the gyroscopic flywheels, leaving the remaining 295 h.p. for forward propulsion of the unicycle, which will carry its driver in a seat behind the engine. Now the horse-power is defined as the equivalent of lifting the weight of 33,000 lb., vertically, the distance of 1ft. in one minute. This is applied to the problem of the engine lifting its own weight of 550 lb. forward and upward through an angle of 90°, the lifting movement following the arc of a circle. As the engine frame is 5ft. long, the engine travels in a circle, whose diameter is 10ft. and circumference 31.416ft. This supplies the inventor with the equation: 295 (h.p.) equals 550 (pounds weight of engine) times revolutions per minute, times 31.416 (circumference) divided by 33,000

$$295 = \frac{550 \times \text{r.p.m.} \times 31.416}{33{,}000},$$

the result of the equation being 563 r.p.m. The unicycle, with a 14ft. diameter, revolving 563 r.p.m., would cover 4.69 miles in a minute.

The steering would be by means of a wheel, which would be connected with the gyroscopic flywheels, shifting them from right to left (or the reverse) upon the axle. This does not cause the unicycle to lean to one side in turning.

[Naturally one would expect a high speed from so powerful an engine, but the air resistance would be enormous at the speed suggested. About 150 m.p.h. would be the absolute limit of the machine.—ED.]



An experimental model unicycle. Its weight is 60 lb., wheel diameter 20 in., and the engine develops $\frac{1}{5}$th h.p.

HOW NOT TO INVENT.

Hints and Tips to Would-be Patentees of War-winning Devices.

WE have on several occasions received complaints from our readers who have submitted inventions to the Ministry of Munitions, and have met with what they consider high-handed treatment. We, ourselves, receive our share of hare-brain schemes, and only this week we had one from a reader who was inventing a new aero engine and wanted to introduce the gas into the cylinder by means of a vacuum instead of by the suction usually employed! This same inventor also wanted to know if the "temperature was increased in a vacuum?"

The Ministry of Munitions *Journal* for June, 1918, contains a most illuminating article on "Rejected Inventions." The heading of the article states, "Every suggestion sent to the Inventions Department is carefully considered. About one in every ten is novel and possible, and these receive detailed examination. The other nine-tenths are impracticable, the same impossible ideas recurring many times over in the course of a year."

The inventions fall into several classes, which may be set out as follows: (1.) Mere sketches entirely inadequate and generally dealing with poor and useless ideas, or dealing with them in an entirely inadequate manner, so that the amount of work required to bring the idea up to the state of practicability is out of all proportion to any probable benefit. (2.) Appliances and schemes either entirely lacking in novelty or no better than similar devices already in use. (3.) Ideas with certain advantages attached to them, but necessitating more trouble than the advantages to follow would justify. (4.) Proposals relating to subjects already under investigation which do not carry the matter any further than the stages already reached. (5.) Suggestions, many of which are hopelessly impracticable, are sent in over and over again by well-meaning persons with insufficient knowledge.

Aeronautics.

The article quoted goes on to point out that many people seem to think there is no limit to the lifting power of hydrogen, "if we may judge by the numerous suggestions for filling the interstices of the planes of an aeroplane with it, and providing hydrogen-inflated suits for airmen. Also armour-plated balloons are often suggested, and the transport of artillery by aeroplanes and troops by balloon has been warmly advocated." Paddle wheels are often put forward as an alternative means of propulsion for aeroplanes, while the helicopter proposal is continually cropping up. As the *Journal* rather happily points out, the difficulties to be overcome in using helicopter screws are something like those that would be experienced by a man who tried to carry a loaded wheelbarrow in preference to pushing it.

The use of free balloons is continually being advocated, to be launched in a favourable wind and to do all sorts of unpleasant things to the enemy; sometimes to carry magnets hung on strings to attract the rifles out of the men's hands! We think that Mr. Heath Robinson has already thrown some light on this question, and, if memory serves us aright, he illustrated in detail his scheme working out on the field.

Some of the schemes for dealing with hostile aircraft are so wild that we will pass them over with mention only of three: (*a*) Covering the moon with a big black balloon. (*b*) Projecting heat rays on Zeppelins, and so setting them on fire (this idea, by the way, although, of course, not applied to Zeppelins, was suggested in the thirteenth century by Roger Bacon). (*c*) Projecting electric waves to paralyse the magnetos.

Motive Power.

In this sphere perpetual motion schemes abound, but they seldom present features of interest or originality, the majority being of the "overbalancing wheel" type, which dates from the thirteenth century.

As regards petrol substitutes proper, one gentleman had a powder which, on being mixed with water, was to turn it into a motor spirit. Another proposed base was the grease skimmed off soup.

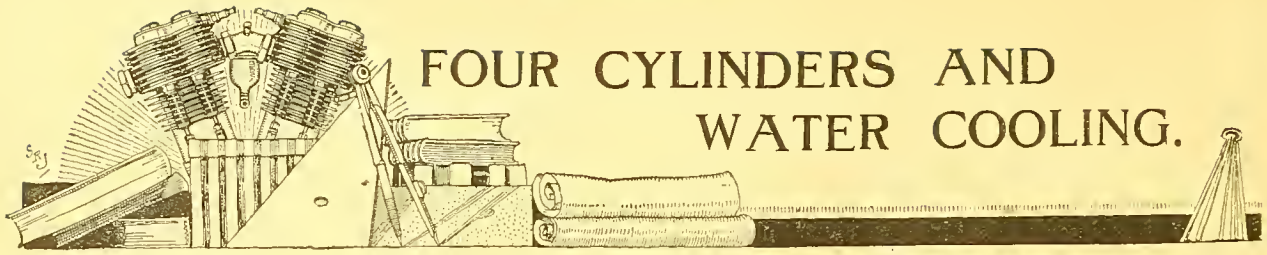
"Two-stroke engines are a 'popular line.' Most of them are submitted only as rough sketches, and present no features that are not illustrated in the various books that are obtainable on internal combustion engines. *These books very seldom seem to have been consulted by would-be inventors, some of whom will even experiment and waste their money rather than read about what has already been done.*" (The italics are ours.)

"A steady stream of carburetters pours in, with claims for saving anything up to 50% of fuel.

"The last type of engine which will be alluded to, and which is perhaps the most alluring of all to dabblers in invention, is the internal combustion turbine. The inventors usually produce sketches, in complete ignorance of the fact that a great deal of serious work has already been done in this direction with, it must be confessed, rather disappointing results. Nor have they the faintest idea of the magnitude of the problem they are up against, or of the fact that it is one that will take years to solve, if ever it is solved at all."

It is extraordinary what a number of inventors turn to the use of heat rays. As we have already pointed out, the use of concentrated heat beams to set fire to an object was suggested by Roger Bacon in the thirteenth century, but, as the *Journal* shows, the scheme is impossible of practical accomplishment with any of our known apparatus.

"A very great number of ideas are put forward by people anxious to help, who have evidently never read a good book on the subject in which they are interested, which would have told them that their schemes are not novel, but have already been tried and given up. In fact, the following words, which occur in the introduction written by the late Sir Hiram Maxim for a book called 'Travels in Space,' far from being limited to aeronautics, may be said to apply to almost the whole field of invention: 'Many experimenters in the past have sought to solve the problem by working out systems which they imagined to be new and original. They have spent their time and wasted their money in working over well-beaten tracks that have been travelled by many others before them, and found to be impracticable.'"



FOUR CYLINDERS AND WATER COOLING.

A SUGGESTED POWER UNIT FOR POST-WAR MOTOR CYCLES DE LUXE.

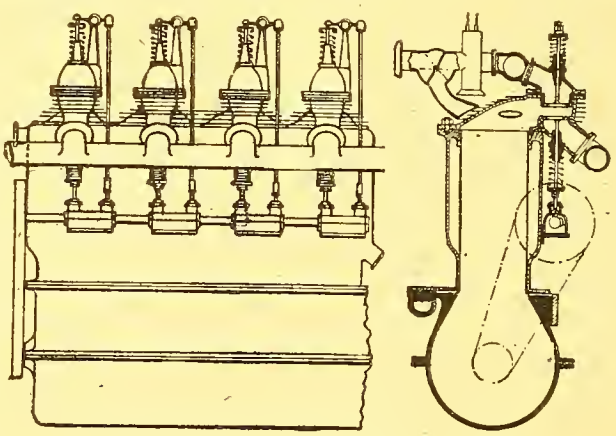
AS is the case with other things, the design of future motor cycle engines lies in the lap of the gods. Still we may venture a guess as to what is in store. First year post-war machines are not likely to differ greatly except in minor details—and these hardly connected with the power unit—from already well-known and accepted types.

Writers in *The Motor Cycle* have recently given several pointers which may show the trend of post-war design. In the two or three years post-war engines, especially of the passenger type machine, it seems fairly certain that the four-cylinder type, and perhaps water-cooling, will be in evidence, if not pre-eminent.

We have it from "Ixion" down to the numerous writers who grace the Correspondence columns, that aero engine practice is going to revolutionise motor cycle engine design. Aluminium is to be used in various forms and for various purposes. Even though its cost appears to be high at present it is expected that it will be available in far greater quantities than ever and at a reasonable cost within a period of two or three years after hostilities cease.

As far as water-cooling is concerned, it would seem that this will be ruled out of court if for any reason aluminium should *not* be available, as the weight of a water-cooled unit would otherwise mount up to such an extent as to be almost prohibitive.

In the accompanying sketch a rough idea is given of a design for a four-cylinder engine in which are incorporated one or two points which will be new perhaps to some readers.



FOUR CYLINDERS AND WATER COOLING.

A suggested design for a four-cylinder motor cycle engine. Steel tube cylinders with aluminium shells, a camshaft outside crank case, steel ball tappets, and heat adjustment to extra air, are some of its special features.

It will be noticed that water-cooling is arranged for, but that the cylinder walls only are water-cooled. The following reasons are adduced for this. An engine may be cooled in four ways.

A. Water-cooled cylinder and water-cooled head.
B. Water-cooled cylinder and air-cooled head.
C. Air-cooled cylinder and water-cooled head.
D. Air-cooled cylinder and air-cooled head.

Merits of Various Cooling Systems.

These four methods are placed in order of merit as regards cooling. On certain models D gives fairly good results. C, however, would be an improvement, speaking only from the point of view of cooling, but, for reasons which need not be pointed out here, is not worth while on a four-cylinder engine. Now the great advantages of B over C are (1) a non-complicated cylinder head and a simple cylinder casting; (2) a very much greater area of cooling surface, meaning cooler piston and lubricating oil; and (3) the cylinder is kept at a more uniform temperature, thus preventing distortion. By method B one would expect to get that overall reduction in temperature of cylinder and exhaust gases which is required to eliminate the overheating troubles ordinarily experienced with air-cooled machines.

The Suggested Design.

In the design shown the cylinder is a steel tube and the outer casing is of aluminium. The joint at the bases of the cylinders is quite watertight, and that at the top is made so by the method of bolting on the cylinder head. An attempt has been made to keep weight down to an absolute minimum and to provide castings of as simple a form as possible.

The overhead inlet valve is placed immediately above the exhaust in the manner recognised as giving the best cooling to the latter. If both valves were overhead operated a more symmetrical form of head could be obtained, but with the small cylinders of a four-cylinder engine there would be little advantage in this.

The valves are worked by a camshaft running the whole length of the engine. The shaft would be forged in one piece with the cams. The drive of the camshaft is by chain or spur wheels.

It will be noted that the carburetter differs somewhat from the usual type. It is placed immediately over the engine. An arrangement is made so that the extra air may be (1) shut off completely for starting up; (2) drawn from the cylinder head as in cold weather, with heavy fuel, or as may be found desirable for economical running; and (3) opened directly to air at ordinary temperature, as in warm weather.

It is expected that, even with additional weight of water and radiator, the total weight of the arrangement

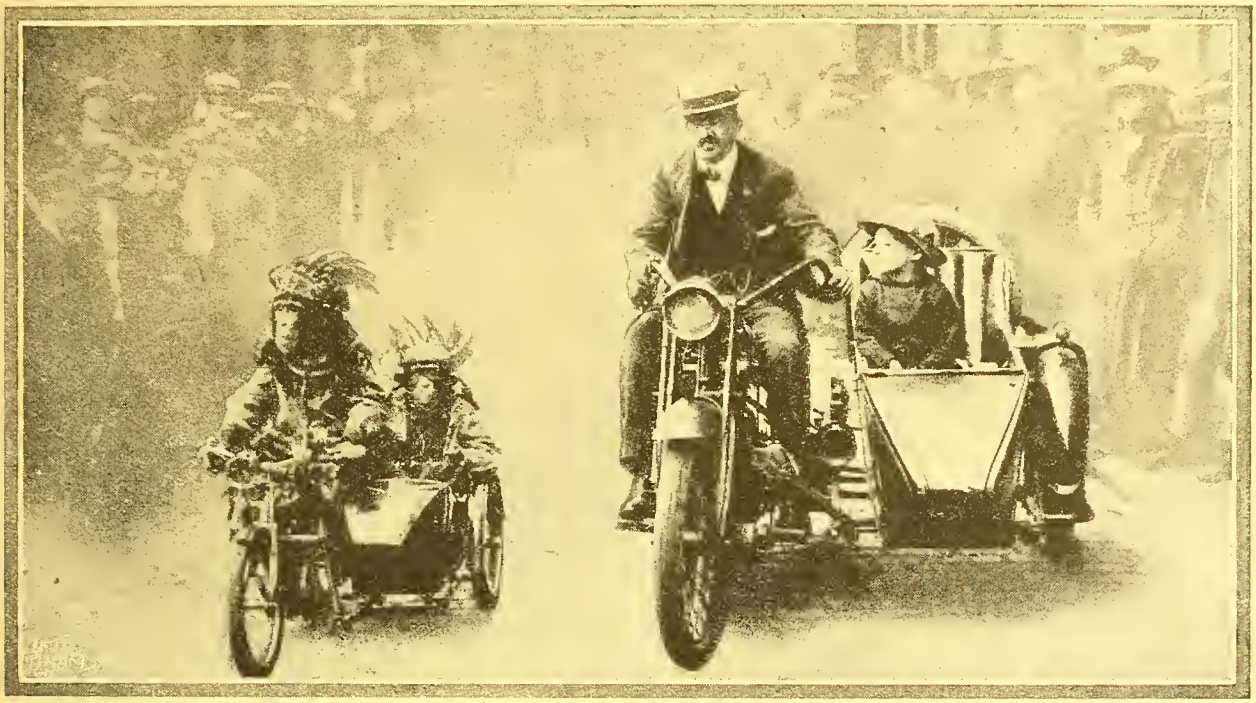
Four Cylinders and Water-cooling.—

shown would compare very favourably with an all cast iron air-cooled engine of the same cubical capacity.

The foregoing design is not put forward as being absolutely ideal. Indeed, it would be most interesting to know what in the opinions of readers of *The Motor Cycle* does constitute the ideal four-cylinder motor cycle engine. In asking this it is not intended to refer to transmission, frame, or springing, but simply to the power unit. There are plenty of points to be settled. Should it be water-cooled, air-cooled, or partially water-cooled, and by what system? Should it have overhead or side-by-side valves? Should it have camshaft inside or outside the crank case? Should the carburetter incorporate an arrangement for heavy fuels, such as it is said will be doled out to us *après la guerre?* Should it have sump and circulation lubrication or pump and stagnation, as some wit has put it?

A word may be said about water-cooling. The greatest benefit to be obtained from this is not the occasional and transient advantage of being able to climb, say, a certain stiff gradient without stalling or overheating. Whilst this may be the case, of course, the main point is that the life of the engine and immunity from constant tuning, overhauling, decarbonising, and plug renewing are probably 100% greater with water-cooling than with air-cooling.

C.R.E.



A miniature motor cycle and sidecar, complete in every respect, used by the chimpanzees, Hiawatha and Minnehaha, on the music hall stage. In July, 1914, we showed Little Nap on a similar outfit made by Messrs. Hobart Bird and Co. The comparative size of it may be judged by the Matchless outfit.

A Further Note on Air-cooling.

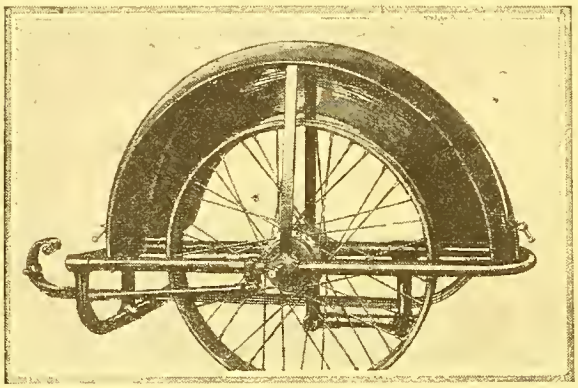
MR. PHILLPOTT makes merry over my incursion into air-cooling problems, but unfortunately confines himself to details of small importance. To the best of my belief no motor cycle has ever had a carburetter so fitted that its air intake would come within the area where a partial vacuum exists under certain conditions astern of the cylinder. However, if a carburetter were so fitted the suction at the intake would be ample to fill the carburetter, since the speed of the gas stream is so high. The carburetter was deliberately omitted from my diagrams, together with the exhaust pipe, since neither of them has any right to occupy its standard position. It is practically impossible to prevent cylinder distortion if the combustion chamber has enormous knobs of metal cast upon it in positions selected without reference to their influence on cooling. Both gas ports will ultimately be removed to the cylinder head. It is not particularly difficult to prevent broken valves, and a conscientious designer will try to endow his valve with the maximum working life, but this has not been done with any motor cycle engine now on the market. The technical shortcomings of motor cycle engines are thrown into high relief when we compare tourist machines with lightweights. Designs which are usable on machines of 3½ h.p. and upwards prove terrible washouts when they are translated into terms of 1½-2 h.p. The main reason is that inferior design will pass on light duty engines, normally run on very small throttle openings and at low r.p.m.; but when a similar design is tested in a heavy duty form on a tiny engine which is driven hard its manifold shortcomings are quickly apparent. As I tried to show, and I think I must have succeeded, the whole question is one that needs very careful deliberation.

ROAD RIDER.

CHANGING THE SIDECAR WHEEL.

A New Design to Facilitate Interchangeability.

THERE are several manufacturers who specialise in making all three wheels of their sidecar combinations interchangeable: but the sidecar wheel generally presents certain difficulties when one is riding alone. It is necessary to lift the whole sidecar bodily to get out the wheel and put in the spare. This requires no small effort, and frequently means asking for help from passers-by.



A new detachable sidecar wheel recently introduced by the makers of the New Comet cycles.

A Design Applicable to Existing Machines.

Mr. A. H. Haden, of the New Comet Works, Princip Street, Birmingham, has introduced a new design applicable to the A.J.S., Clyno, and Matchless models, all of which work on the "knock-out spindle" principle. The new wheel is stayed on both sides; the spindle being easily withdrawn liberates not only the wheel, but the vertical stays of the mudguard; two wing nuts at either end of the guard being loosened, both wheel and guard can be lifted out above the frame, not underneath, as is usually the case. A stand is provided which just raises the wheel clear of the ground, and the whole operation can be carried out single-handed with comparative ease.

Unlike so many new developments that cannot be placed on the market at the present time, a very limited number of sidecar chassis with this new wheel fitting can be supplied at once, but, of course, only on priority certificates.

LONG STROKE ENGINES.

A Further Contribution to a Recently-revived Discussion.

CAPT. LINDSAY is all in for the long stroke engine, and doubtless for the ordinary tourist this type of engine is preferable to the opposite type. On reading Capt. Lindsay's interesting and comprehensive notes, however, it occurred to me that he was hardly judicial in summing up the pros and cons of the problem. He is rather inclined to take one long stroke of superlative and proved merit and to compare it with short strokes in general, rather than with the correspondingly best of short strokes, and similarly, if I may be perfectly frank in criticising, he is apt to ascribe all the distinguishing merits of this particular engine solely to its long stroke, whereas a dozen other factors enter into the question. Valve timing and the contour of the cams, for instance, are of infinitely greater importance than the bore and stroke ratio, and whereas the long stroke engine my colleague favours aims at certain results which please him, the average short stroke aims at something else; and in attaining these two distinct and separate ends the length of the stroke is but one of the factors concerned. If, for instance, the long stroke Norton were timed and provided with tappets coinciding with those of a short stroke, high revving, high compression engine, all those virtues Capt. Lindsay claims for it would vanish, and similarly if the high compression engine were tuned on the lines of the Norton, half the arguments against it would cease to hold good.

Let us view the matter from another standpoint. I believe that if Mr. Norton had decided a few years ago upon the square engine, and had developed it in the same manner as he has developed his present unit, he would have produced something just as good, just as pleasing, and just as successful. Thus one cannot claim that one particular feature in the design of an engine is responsible for its success; it is the *tout ensemble*, the combination of the unit as a whole, which causes it to coincide with the taste of a certain class of rider.

A Matter of Taste.

Personally, I have no use for long stroke, low compression, low revving engines, except for cycle car propulsion, or possibly for heavy sidecar use, and then the disposition of the cylinders must be such that reasonably good balance is obtained. Single-cylinder solo mounts are rather an affliction at any time, but the long-stroke hard-slogging variety should be confined to the delivery of butcher's meat or to the use of gasfitters' boys and other similar unrefined individuals. The 3½ h.p. T.T. Norton is, of course, an admitted exception, but, so far as my experience goes, including American singles, it is the one and only exception, and even the temptations of doing 160 m.p.g. and indefinite engine wear would not induce me to accept one of these abortions as a gift, unless I could sell it within twenty-four hours. I refer particularly to the 4 h.p. and over type; if we are to have big singles, let us at any rate make some pretence at decent balance and torque, and this can only be done by keeping down the stroke and keeping up the revs.—unless, of course, we employ gas engine flywheels and build the whole frame on elephantine lines, which would be more than a slightly retrogressive measure at the present time.

No, let us aim at reducing weight, obtaining perfect balance, and good torque; personally I do not care a straw about the bore and stroke ratio. You cannot see it, so why worry about it? CHINOOK.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

CYCLE CARS.

Sir,—I note with pleasure your occasional reference to cycle cars in the pages of *The Motor Cycle*. If two and three-wheeled vehicles can be successfully produced on what one may term "bicycle" lines, it seems to me to be only a matter of perseverance before a really popular four-wheeled car is available. And if British firms will not make an effort, I fancy that American firms *will*. H.A.

Colchester.

PETROL CONSUMPTION.

Sir,—Will you please say what mileage you consider one should get per gallon with a 6 h.p. A.J.S. and sidecar, taking into consideration the present day poor quality petrol?

I am using my machine in exceedingly hilly country and inferior roads, but for the last few months I have managed to run 60 m.p.g., which seems to me to be particularly good.

I purchased my machine in September, 1917. It is fitted with 700 × 80 Dunlop tyres. I have now run over 4,000 miles, and nothing has been done to the machine except decarbonise the engine, and the tyres are still unpunctured and look good enough for many miles. Usual disclaimer.

Yorks. CATTERICK.

[Under the circumstances we consider 60 m.p.g. to be very satisfactory.—ED.]

THE VERY SIMPLE CYCLE CAR.

Sir,—In *The Motor Cycle* of June 13th was a description, with illustrations, of a simple two-seater cycle car, designed by Mr. E. Gibbons. This is the type of machine I have had in my mind for some time, and would like to ask Mr. Gibbons if he could possibly let me have fuller particulars of the design, dimensions of body, methods of springing, braking, fitting, countershaft, etc. I hope to build one of these runabouts when peace times come again, and this is the best design for my purpose I have yet seen.

I am a New Zealander, and a mechanic by profession, so take a keen interest in all developments of motor-driven vehicles. I have taken your paper since 1914, and have derived a good deal of valuable information from it. I consider the Aviation Section to be extremely interesting and helpful, while "Ixion" always has a most readable page.

N.Z.F.A., France, GUNNER A. L. THOMPSON.

NUTS AND THREADS.

Sir,—I take it that the gist of Capt. Kirk's letter in your issue of June 6th is a complaint against the British manufacturers for not providing a fool-proof thread in positions like the footrest, where force is necessary to remove the bolts. Obviously, bolt threads should never be thumped with anything harder than a lead lump, be time ever so pressing and whatever the country of origin. As regards American *v.* British practice in this detail, disregarding the different "forms" of the two threads, the former appears to use a rather rougher thread than British practice, which generally adopts a standard twenty-six threads per inch or thereabouts, making a more workmanlike job, the tighter fit being occasioned by the smaller "tolerance." As regards the American type being harder, this is a matter of individual design as it is in England. These bolts frequently get bent, and renewal would be the only remedy in the case of a hardened bolt. In the majority of cases they are made from mild steel, and sometimes wrought iron. It would be a very simple matter for the makers to allow an extra quarter inch chamfered off at each end of these bolts so that they could be knocked out without damage to the threads.

Regarding the second part of the letter, compared superficially with the 8 h.p. combination at £125, the American shows up well; but has your correspondent taken into account depreciation, which is a factor decidedly not to be ignored where American machines are concerned? On the one hand, we have a machine representing the highest effort of British engineering, which puts quality first and all the time as opposed to quantity production; on the American side, though it is good *while it lasts*, the dynamo and electrical equipment generally is by no means a lesson to British manufacturers, in construction, or quality, or efficiency.

H. LIONEL WILLIAMS.

HIGHER GEARS FOR SOLO RIDING.

Sir,—*Re* "Argon's" letter in *The Motor Cycle* of May 23rd, as a satisfied owner of a C.S. Zenith, I can endorse every word he says with regard to the infinitely variable gear. Most machines make a noise like a sewing machine as soon as they touch 2,000 r.p.m., and with a 4 to 1 gear and 26in. wheels this only gives about 38 m.p.h., and 4 to 1 seems to be considered a high gear by some of your contributors. I should like to say a word for the Zenith kick starter, as while on leave recently (February), war time petrol notwithstanding, the engine (85½ × 85 twin J.A.P.) would start second kick from cold without doping.

For the post-war model, a 90° twin with outside flywheel and o.h. valves in a duplex spring frame with Zenith transmission should prove very attractive. Usual disclaimer.

Grand Fleet. R.C.H.

EXHAUST POPPET VALVE DESIGN.

Sir,—While looking through *The Motor Cycle* I noticed the designs for exhaust valves, and what struck me was the fact that they were extremely small.

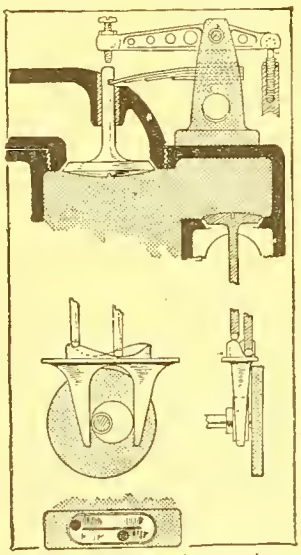
As you know, by pumping up a tyre the valve becomes extremely hot, although no excess of energy is used, and then by letting out the air the valve cools (and gets really cold).

Now, the same applies a great deal to the valves of an internal combustion engine.

In the illustration will be seen the size of the valves in comparison with one another. The exhaust should at least be one and a half times as large as the other.

Both valves should be actuated, if posible, by leaf springs. The design of a cylinder head should be something like that indicated in the sketch.

It will be noticed that the inlet valve is not overhead, therefore the tappets will act alike.



A design for an exhaust valve and special cams, by "R.G.C."

The cams will be something like those shown in the lower part of the sketch.

The type of tappet shown would be absolutely silent.

R.G.C. (R.F.C.).

THE MOTOR CYCLE IN INDIA.

Sir,—One reads in almost every paper nowadays a great deal about trade after the war. Your very excellent paper also frequently contains an Overseas Supplement containing very useful information. But manufacturers do not appear to me to have taken India very seriously into their consideration, but seem to be allowing the American to make too much headway. This, I hope, will be corrected after the war.

In less troublous times I am in the Indian Police, and I find a motor cycle not only very useful, but almost a necessity in my work. There are also several other services in the same position, viz., the I.C.S., the Forest Service, and the Public Works Department. At the risk of telling you something in all probability you already know, I will explain that our jurisdictions usually consist of districts covering an area of anything between 3,000 and 8,000 square miles, with a headquarters somewhere in it, but not always in the middle. It will therefore be quite clear that we sometimes have long distances to cover, and it goes without saying that sometimes we want to get there with the least possible delay. We have not as a rule a network of railways, and therefore we fall back on motors. It is a great mistake to suppose that Government servants are so well paid that they can afford to keep motor cars. The obvious solution, therefore, is a motor cycle and sidecar to carry one's kit.

Having arrived so far, let us have a look at our conditions. Most districts have roads of some sort, either metalled or unmetalled, or else cart tracks, which are as a rule quite passable with care. Roads, however, are not always very good, and this knocks speed on the head. Our requirements, therefore, are, in brief, a good strong machine, single-cylinder for preference (I will explain why later), about 4½ h.p., chain-driven, with the magneto placed high on account of the frequent rivers which have to be crossed.

Now, I say single-cylinder for preference because, as a general rule, there is not a motor shop within a hundred miles, and one, consequently, has to depend on oneself for keeping the machine in running order. Therefore, the requirement is a good strong single-cylinder motor bicycle which will run for a year with little more attention than regular oiling and periodical removal of carbon deposit. At the end of a year one would probably be able to send it into Bombay, Calcutta, or one of the other big towns for an overhaul.

As regards sidecars a coachbuilt one of fairly generous proportions, strong and well-sprung, is all that is required. The larger the wheels are the better—28 × 2½, or even 3in. Moreover, they should be very easily detachable, as it is no joke to sit down on the side of a bare and shadeless Indian road with the thermometer at 110° in the shade and 150° in the sun and attempt to take off a stubborn wheel.

At present, and before the war, the Americans with their Indians and Harley-Davidsons bid fair to hold the field. These machines are, of course, very nice to ride, but they do not come up to English manufacture in the matter of simplicity, and it must be remembered that out in India the owner has perforce to be his own mechanic, and cannot spare a great deal of time to look after his machine.

In conclusion, let me say that if any manufacturer who may see this letter considers he has the article I require, I hope he will communicate with me, c/o Messrs. Cox and Co., Bombay, and I can assure him that if he has it I will take one as soon as he can supply, and on seeing it I am quite sure any number of other service men will covet it. In short, he would do well to establish agencies in several places in India.

C. E. LYNCH-BLOSSE.

Mesopotamia.

HYDROGEN FROM WATER.

Sir,—Once upon a time, at midnight, there was a poor unfortunate motor cyclist who put water into his tank from a can which retained the scent of better days. This occurrence taking place in the Somme wilderness during the frost of January, 1917, the result may better be imagined than described. When "Ixion" is next awakened by the haunting memory of his now notorious timing-speedometer drive, let him console himself with thoughts of a kindred spirit kept awake by the thoughts of that memorable "push." Even next morning, when the filler cap was removed to display a striking panorama of Iceland, I am sorry to relate "Pilot's" remedy did not suggest itself—a few drops of water, a few inches of wire—*et voilà!*

In spite of many cutting remarks to the contrary, Service men are aware that water is useful and that petrol is not the only liquid with which we may wash hands, clothing, lorries, or aeroplanes; but, unfortunately, that epoch has not yet arrived when water is a huge success in the tank. With many other people, I regard the days when we shall be able to go for a hundred mile spin, replenishing tanks at the nearest tap or horse trough, as the millennium, to which goal I hope "Pilot" is directing us.

May I now ask for a little more information, and at the same time put forward a few elementary facts?

First, how does "Pilot" persuade his current to pass? Water is not an electrolyte. The usual laboratory process spoken of as the electrolysis of water is really the decomposition of dilute sulphuric acid; but as the quantity of acid remains the same during the reaction it is convenient and simple to regard the action as the electrolysis of water. Of course, the addition of any soluble salt would render the liquid a conductor, but other compounds would be formed dependent upon the salt used. The chemical action between dilute sulphuric acid and the tank would no doubt increase the rate of evolution of hydrogen, but for how long?

Secondly, may I direct a little attention to the serious loss of volume caused by exploding the mixture of hydrogen and oxygen. Assuming Avogadro's hypothesis, as every text book on chemistry does, we find that—

2 volumes hydrogen + 1 volume oxygen = 2 volumes of *steam*.

Analysing this, 210 c.c. of correctly proportioned mixture drawn into a Radco cylinder would explode to give 140 c.c. only of steam, provided that the temperature of the engine could be maintained at a *temperature above 100 C°*. Thus, for the last third of its downward travel the piston is fighting against the formation of a vacuum. When the temperature has not yet reached this point, liquid water must be formed, and the piston has an even greater struggle to prevent the creation of that which Nature abhors, as 144 c.cm. of steam condense practically to zero. In actual laboratory practice one always uses a large excess of one of the constituents to avoid cracking the tube from the hammer-like blows produced by sudden release of all pressure within the tube, and in measuring the quantity of the residual gas the quantity of water is ignored, as it is infinitesimal. Whatever the force of the explosion in the Radco cylinder much power must be lost by this tendency to form a vacuum, although against this we must set out the fact that it is likely to prove a decided asset in a two-stroke as regards induction of a fresh charge, and, in addition, there would be no objectionable exhaust to scavenge, as the latter would appear as dew on the cylinder walls until a temperature of 100° C. was reached. Do these facts account for "Pilot" having to start on petrol?

Thirdly, according to the diagram given, oxygen is allowed to escape. Why expel this essential of combustion and substitute air containing a very high proportion of useless nitrogen? In connection with this why not use the tank as the positive electrode?

Fourthly, from the description given, current is derived from the earth terminal of the magneto. I assume this is the terminal to which the switch is usually attached on cars. The addition of such a high resistance as a voltameter is surely going seriously to lessen the current in the primary winding, and therefore have a bad effect on the voltage induced in the secondary, thus causing a very weak spark. Again, I have found that the electrolysis of water by current from a four-volt accumulator not a very rapid process. I should be very pleased to discover how a six-volt *intermittent* current could supply a sufficiently continuous stream to maintain sufficient hydrogen for hundreds of cubic centimetres thousands of times per minute. A water resistance in an arc light circuit of over a hundred volts does not keep a man busy filling the bucket as the water is decomposed.

In conclusion, I like to hope that the water engine will become a thing of importance to this generation. At the same time, the old stereotyped pattern of petrol engine has borne much in the direction of fuel; but any self-respecting engine has its limits, and must not be expected to remain adaptable to everything thrown into its tank. Even an ostrich has digestive limits. To my idea, the engine must be specially designed for the purpose, the expulsion of a water exhaust being one problem alone for serious consideration, besides the question of the deleterious effect of water on bearings.

B.E.F. A. M. FREEMAN.

IN FAVOUR OF LIGHTWEIGHTS.

Sir,—I quite endorse all that is said by "Ixion" in your issue of June 20th.

The lightweight is the machine for the average man, and there is no doubt it has suffered in the past from its cheapness, but this does not apply to every make. The 2¾ h.p. A.J.S. which I bought in 1915 has done 11,000 miles, and is still going as well as when new. I can go 160 miles on a gallon, and the repairs have been one new piston ring and two springs. I see no reason why other makers should not equal this, and 3 h.p. or over is not required. G. POTT.

FRONT BRAKES.

Sir,—Though at all times a keen enthusiast of the British motor cycle, there is, I think, one very weak point in its design, that is, the front brake.

It is a point on which the American makes, at least the heavy models, score with the two separate powerful brakes on the back wheel.

I need only quote from one of your correspondents, whose letter you published in your issue of June 13th, and this contains the opinion of very many motor cyclists—"I find the front brake useless, no matter what adjustments I make"; and this refers to a type of bicycle which has a special brake rim.

A short time ago I was riding a well-known English make, fitted with the ordinary rim brake, when one of the brake blocks, having become loose, caught in the wheel, the result being most unpleasant.

Many riders take the front brake off entirely, but surely a hub brake, or at least some improvement on the present old-fashioned one, might be tried.

R. ROBINSON, SEC.-LT.

FRIENDLY RIVALRY.

Sir,—The article in *The Motor Cycle* of June 20th on the virtues of the 3½ h.p. single-cylinder is most interesting. During the past twelve months two people doing similar work, and riding the same roads at the same time, have covered about 150 miles a week, one on a 2¾ h.p. 1915 Douglas, the other on a 3½ h.p. 1917 Sunbeam.

The riders wonder why the flat twin—though it often gets there first—is so full of moods and fancies and has so many regrettable incidents, while the 3½ h.p. keeps quietly on.

In grease, or on loose dusty roads, the Douglas sails ahead, apparently unconscious of anything threatening its stability; while the Sunbeam wags its tail and scares its rider into second speed; but, on a good road up hill, the Sunbeam says goodbye to the Douglas, and they meet again later, the Douglas arriving somewhat hot and bustled, while the Sunbeam is getting ready for the morrow.

On a cold day the Douglas gets away first, but when both machines are warm they start equally well. As far as tyres, petrol, and lubricating oil expenses are concerned, there seems nothing to choose. Evidence as to whether the Douglas has ever been decarbonised is conflicting and uncertain, but it never knocks; while it is quite certain that the Sunbeam needs decarbonising every fifteen hundred miles if it is to climb long hills sweetly on top and never get in a konk before the air lever is put back a bit.

In the hands of equally capable riders, the average summer speed of the 3½ h.p. would be higher than that of the flat twin; but in the grease of winter, and especially in grease and pot-holes combined, the Douglas scores.

What is the explanation of this? Why does the flat twin hold the road better? Is it due to the engine position in the frame, the lower gear, the more even torque, the belt drive, the low compression, the frame, or against commonly accepted ideas—the lighter weight?

As far as general reliability goes, the 3½ h.p. single excels, but in the matter of all-round ease of control the 2¾ h.p. seems superior. You take your choice, and, in any case, pay your money. Both riders are satisfied with their machines and do not wish to exchange.

TWEEDLEDUM AND TWEEDLEDEE.

Folkestone.

MAGNETO DESIGN.

Sir,—I have read with much interest the criticisms by your correspondents "Wilbur" and "Engineer" on my ignition device which appeared in *The Motor Cycle* on May 9th.

Their main objection appears to be that the inductor on the piston does not cut the lines of force as rapidly as the rotary armature. The following will show that, on the score of rapid cutting of the lines of force, the reciprocating armature has a decided advantage over the orthodox type.

Take, as an example, an engine of 70 mm. (2¾) stroke and a connecting rod of twice the stroke.

Call the stroke L and the ratio of connecting rod length to stroke N. Also let us assume that the crank makes one revolution per second. Then the velocity of the piston at the point where the change in the direction of the lines takes place (*i.e.*, 45° early) is $\frac{\pi L}{12}(\sin\theta + \frac{1}{2N}\sin\theta\cos\theta)$, which, for the angle given, equals, say, .6ft. per second, or 83% of the crank pin velocity.

Now, if we eliminate the constants in the above expression, it will be readily seen that the diameter of a rotary armature to correspond to this piston speed will be 83% of the stroke of the engine, which in this case works out at 2.28in.

To compare. The small Bosch magneto has an armature of 2in. diameter and the C.A.V. is 1¾in. diameter.

From this it will be seen that the reciprocating inductor cuts the lines 12% faster than the Bosch and 22% faster than the C.A.V.

In conclusion, I thank your correspondents for their criticisms, and trust the above will remove any doubt about the point involved. R. W. RICHARDS, LT.

IN AN EASTERN CITY. One of the many fine avenues around Cairo.

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

"Mixing" an Engine.

Could I fit the cylinder of a well-known 3½ h.p. to an engine of another make?—A.M.G.

As far as we are aware, the answer to your question is in the negative. The only way to make absolutely certain, however, would be to try the cylinder in question. It is impossible to get the information from the makers, either of the motor cycle or of the cylinder, because the maker of the motor cycle is ignorant of the exact dimensions of the cylinder, while the makers of the cylinder are similarly ignorant of the dimensions of the other crank case.

A Lightweight Two-stroke.

(1.) Would you kindly tell me if a 2¼ h.p. single gear two-stroke would be suitable for a run from London to Scotland and back? (2.) What m.p.h. would it average on tour? (3.) What m.p.h. should this machine do all out?—S.A.S.

(1.) Yes; but it would be rather wearisome driving so small a machine so long a distance, on account of the high number of explosions of the engine. Also there are certain hills on which you might find a difficulty, owing to the absence of a change speed gear. (2.) About eighteen miles an hour. (3.) About thirty miles an hour.

The Use of Petrol.

I have a motor cycle which has been stored for some time, and which I am now desirous of selling, and as the purchaser is sure to require a trial run, will you please give me some information? (1.) Can I get a special permit to use petrol for a trial trip? (2) or to deliver the bicycle by road, say fifty miles? (3.) Am I liable for the local taxation licence for this one trip?—W.H.C.

(1 and 2.) Petrol or petrol substitute obtained under a motor spirit licence may be used for the purpose of driving a motor vehicle for a distance not exceeding twenty miles in connection with the *bonâ-fide* sale or intended sale of such vehicle, provided that the seller has obtained the permission of a superintendent or other chief officer of police of the area in which the motor vehicle is kept. (3.) Strictly speaking, you would be liable for the local taxation licence, but we do not think the authorities would take action under circumstances of this kind.

A Motorists' Black List?

Some time ago I broke my piston. I sent for and got a new casting, and took it across the road to a motor garage, and got the owner to turn it and drill gudgeon pin hole; all the fitting and filing up I did myself. The repairer now sends me in a bill for 30s. for the work, which seems to me extortionate.—A.H.H.

Thirty shillings seems to us certainly an extortionate charge for the work done. The pre-war price of an 85 mm. piston complete with gudgeon pin and rings was considerably below 30s.—in fact, it was nearer to £1—and even allowing for the increase in cost of material you ought to be able to get one now for about 30s. You do not give the size of your piston, but the size we have quoted is for the largest usually used in a motor cycle engine.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Knocking after Overhaul.

(1.) I have just had my machine rebushed and fitted with a new piston, as the old one was cracked. The piston is a good fit, and the bushes are not too tight, but an unearthly knock sets up as soon as the engine begins to fire, on either high or low gear. The machine is a single 4 h.p. Martin. Also, the vibration is excessive at all speeds, though the frame and engine bolts are as tight as they can be. I have tried all sorts of magneto timing. (2.) Does hydrogen come under the gas restrictions Order?—S.E.

(1.) You say that the bushes are not too tight, but you do not make it clear that you are satisfied they are not too loose. Perhaps this is the trouble. The vibration is doubtless owing to loss of balance, due to the difference between the weight of the original piston and that of the new one. Possibly the flywheel or bearings are somewhat out of truth. (2.) No.

Weight, Speed, and Consumption.

Will you please give me a reply to the following points respecting the Allon single-cylinder motor bicycle? (1.) Approximate weight ready for the road. (2.) What speed should be easily maintained over ordinary roads? (3.) Approximate petrol and oil consumption.—C.H.F.

(1.) The weight is about 150 lb. (2.) The speed should be about 30 m.p.h. (3.) A gallon of petrol with half a pint of oil mixed with it will last about 100 miles.

Carburetter Flooding.

(1.) Why does my 2¾ h.p. two-stroke carburetter spray petrol up and over the float chamber when the petrol is turned on fully, but when half turned on it does not do it? I have fitted a new float, ground in needle valve, and lowered the brass collar, which now makes me give threequarter air and quarter petrol instead of, previously, full air. I can do eighty miles to the gallon, but if I lower the collar again, will less air overheat the engine? (2.) What is the best position of the levers for running down a hill?—W.T.O.

(1.) Evidently the carburetter is flooding slightly, and it is quite possible that the needle valve and its seating are defective. We do not think that giving a trifle less air will overheat the engine. (2.) Close the throttle—and open the compression release when descending a very steep hill.

RECOMMENDED ROUTES.

SCARBOROUGH TO BARNARD CASTLE.—G.W.R.

Scarborough, Pickering, Kirby Moorside, Helmsley, down Sutton Bank, Thirsk, Carlton Miniott, Leeming Lane (turn right), Leeming, Catterick, Scotch Corner (turn left), Barnard Castle. Approximately 75 miles.

MAIDENHEAD TO SHOOTER'S HILL.—H.A.C.

Maidenhead, Windsor, Staines, Sunbury, Kingston, Malden, Cheam, Sutton, Waddon, Addington, Keston Mark, Bickley, Mottingham, Eltham, Shooter's Hill. This route is shown clearly on the "R.A.C. Official Map of Recommended Routes round London" (obtainable from these offices, price 1s. 10d. post free), and the complicated part, avoiding the traffic from Kingston, is marked in blue, being one of the routes which skirt London.

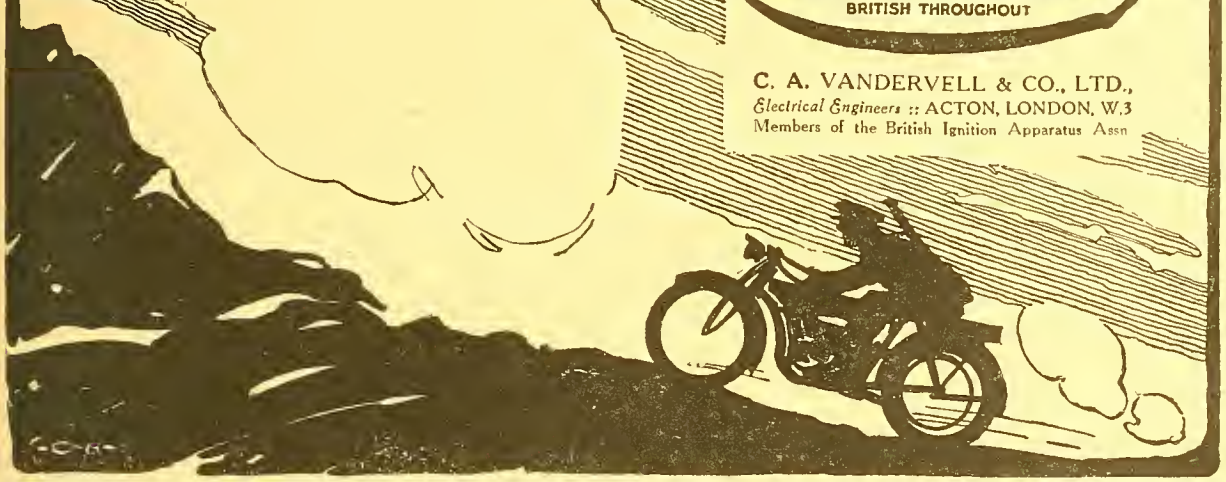
Reliance

THE DESPATCH RIDER under the most strenuous war conditions pins his faith to the ALL-BRITISH

A.V. Magneto

BRITISH THROUGHOUT

C. A. VANDERVELL & CO., LTD.,
Electrical Engineers :: ACTON, LONDON, W.3
Members of the British Ignition Apparatus Assn



"Bowden," Tyseley.

To fast riders in every sphere, BOWDEN Control Fitments represent the limits of instant, reliable, enduring service —by an all-satisfying range of

BRAKES, CONTROLS, WIRES, etc.

Subject to the supply of Government demands, Trade orders are having our promptest possible attention.

Note address:
BOWDEN BRAKE CO., Ltd.,
Tyseley——B'HAM.

R.H.S.

BOWDEN
TYSELEY

BELDAM RETREADS

"Speaking from Experience."

"You retreaded a tyre for me about a year ago with your medium tread. It has been running continuously on the front wheel of my combination, has done 2,500 miles, and has not punctured. This, in my opinion, is a guarantee of your work and my appreciation."
P. V. B. (Portsmouth.)

"re Beldam retread I had over twelve months ago, I am more than satisfied with it. I have used it practically every day, in all weathers, hail, rain, or snow, and, by the look of it now, I shall get a lot more mileage from it." *C. H. J. (Northants.)*

"I am forwarding a 26 x 2¼in. tyre for retreading, and may state that I have had tyres retreaded by you, and have found them equal to a new tyre in wear."
B. H. B. (Bedford.)

Beldam Motor Cycle Tyre All-Rubber Retreads cost from 18/- to 17/6; patching and bursts according to requirements.

The Beldam Tyre Co., Ltd.,
Brentford - - - - Middlesex.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Abingdon-King Dick, 1914, 4h.p., T.T., fast; 25 gns. [6268

ABINGDON King Dick, 1912, Bosch mag., splendid order throughout; genuine bargain, £13/10; appointment.—25, Strafford Rd., Acton. [6474

ABINGDON, 6-7h.p., 1915 countershaft model, with Millford Empress sidecar, combination in topping order, with Lucas lamps, speedometer, and wind screen; price £75.—Below.

ABINGDON, 1914, 3½h.p., Philipson pulley, both lamps and all accessories; this machine is in splendid condition; price £28.—Bromley Motor Works, Masons Hill, Bromley, Kent. [6330

1913 3¾h.p. Abingdon-King Dick, N.S.U. 2-speed gear, Bosch mag., new Dunlop heavy tyres, in perfect condition, enamelled red; price £23.—Geo. H. Ford, 17, Jackson Place, Newport, Mon. [XS829

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A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4987

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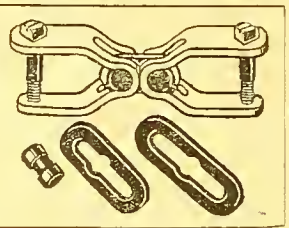

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A.J.S. 6h.p. Combinations.—We have five in stock. If you wish to buy, sell, or exchange your A.J.S., write us.—Farrar's Motors, Hopwood Lane, Halifax. [6124

A.J.S.—Immediate delivery of Military Model, 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—1916 A.J.S., 2h.p., 3-speed, sloping tank, clutch, and kick-start; 52 gns. [6489

DELIVERY from stock of Military Model A.J.S., 700×80 tyres, detachable wheels; £91/6.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [6551

1916 2¾h.p. A.J.S., 3-speed, practically unused; sell £49, or exchange 3-speed Norton, Brough, or 4h.p. A.J.S.—Box 2,072, c/o *The Motor Cycle*. [X5889

A.J.S., genuine 1916 4h.p. twin, 3 speeds and clutch, dropped frame, all accessories, fully guaranteed as new, £67; with coachbuilt sidecar, £75.—Maudee, 100, Gt. Portland St., London, W.1. [6442

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6h.p. A.J.S. Combination de Luxe, 1916, Lucas dynamo lighting set, with electric horn and inspection lamp, screen, spring seat-pillar, spare wheel, Binks carburetter, handle-bar watch, perfect order; £98, lowest.—46, Woodbank Crescent, Sheffield. [X5805

6h.p. Lucas's Dynamo Lighting A.J.S. 1916 Combination, all-chain drive transmission, 3-speed countershaft gear, kick-starter and clutch, de luxe sidecar, detachable wheels, special mechanically fit; 90 gns.—Wauchope's, 9, Shoe Lane, London. [6459

6h.p. Twin Engine A.J.S. Combination, 1916 model, detachable wheels, special engine, countershaft 3-speed gear, all-chain drive transmission, handle-bar controlled clutch and kick-starter, Lucas head and rear lamp, side lamp, hood and screen, speedometer, side lamp, beautifully upholstered; price 90 gns.; guaranteed.—Wauchope's, 9, Shoe Lane, London. [6468

Alldays.

3½h.p. Alldays Matchless, Armstrong 3-speed, free engine, good condition; £32.—39, Ringwood Rd., Eastbourne. (D) [X5674

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Allon, 1918, spring frame, 2-speed, clutch, kick start, as new, 48 gns.; Allon, 1916, 2-speed, perfect, 29 gns. [6255

Ariel.

ARIEL 1914 4h.p. 3-speed Combination; £35.—29, St. Leonards St., Bow. [6422

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Ariel, 1913-14, 3½h.p., 3-speed, just completely re-enamelled and replated; 32 gns. [6250

MOTOR CYCLES FOR SALE.

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1915 6h.p. Ariel, 3-speed countershaft, Bramble coach sidecar, speedometer, lamps, etc., excellent condition; £55.—Walker, Knott Lane, Bardsley, Ashton-under-Lyne. [X5875

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A.S.L., 3½h.p. J.A.P., Grade gear, Bosch mag.; £14/10.—Motor Exchange, Horton St., Halifax. [6344

Auto-Wheels.

AUTO Motor, 3½h.p., Bosch mag., good tyres; £7/10.—Collier's Motories, Deal St., Halifax. [6343

Bat.

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Bat-Jap, 1914, 5-6h.p., 3-speed; 34 gns. [6251

1913 8h.p. Bat-Jap Combination, 2-speed, chain drive, fine condition; £35; would take lightweight part exchange.—Martin, 155d, Northcote Rd., Clapham Junction. [6391

BAT, 6h.p., 1915 or 1916 model, 2-speed, J.A.P. twin-cyl. engine, countershaft gear, includes accessories; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [6462

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RIDER TROWARD and Co., 31 and 40b, High St. Hampstead.—Bradbury, 1914, 4h.p., 3-speed combination; 35 gns. [6258

BRADBURY, 1914, 6h.p., and sidecar, £55; 1912-1913 3½h.p. 3-speed model, £29/10.—Collier's Motories, Deal St., Halifax. [6345

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B.S.A. All-chain Combination; £48, offer, exchange. —24, Beauval Rd., East Dulwich. [6406

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CALTHORPE Lightweight, 2½h.p. J.A.P., 2-speed gear; £24.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3523

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MOTOR Cycle, late 1916 2¾h.p. Calthorpe-Jap, 2-speed, Senspray carburetter, Dixie mag., lamps, and horn complete, had very little use; £33.—Vickers, 82, Royal Hill, Greenwich. [6388

2¾h.p. Calthorpe-Jap, 1916 model, 2-speed Enfield gear, fully equipped and as new, £27/10; also a 2¾h.p. new model, single speed, same make, £32.—Wauchope's, 9, Shoe Lane, London. [6451

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2¾h.p. Connaught, 2-stroke, 1915, just overhauled; £18.—Shoiland, 54, Liverpool Rd., Birkdale, Southport. [X5728

CONNAUGHT, 1916, 2-stroke, like new; bargain, £22. —Foucar, 100, Goddard Av., Swindon. Wanted, 3½ h.p. T.T. Triumph. [6377

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DIAMOND, 2¾h.p., 2-speed, 2-stroke, extra good; £25/10.—Motor Exchange, Horton St., Halifax. [6346

DIAMOND, 1916 sporting model, 2¾h.p., overhead valves, 2-speed gear, chain drive, fully equipped, lamps, etc.; cost £50, accept £40; fast and perfect, not used since 1916; owner unable to ride again, invalided from army.—A. Braid, Gwynfa, Abergele. [X5806

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DOUGLAS, 1910, 2¾h.p., Bosch mag., guaranteed first-class condition; offers.—Grimes, 57, Lancaster Rd., Leytonstone, E.11. [6487

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DOUGLAS, genuine 4h.p. 1915 model, 3 speeds, kick start, just been overhauled, all accessories, including speedometer; £65 with sidecar, or £58 solo.—Maudes, 100, Gt. Portland St., London, W.1. [6443

DOUGLAS.—New 1918 models supplied to doctors, farmers, etc., against Ministry of Munitions permit. 1913 2-speed Douglas, £29/10; 1914 2-speed model, £34/10.—Motor Exchange, Horton St., Halifax. [6347

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RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Douglas, 1916, 4h.p., 3-speed Colonial model, 59 gns.; Douglas, 1915, 2¾h.p., 2-speed, just completely re-enamelled and replated, 39 gns.; ditto, 1914, 2-speed, renovated, 35 gns.; 1913 T.T., 2-speed, 28 gns.; 1911, single speed, 14 gns. [6252

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ENFIELD, 1915, 6h.p., 2-speed coach combination, in fine order, £72/10; 1916 model, £82/10.—Collier's Motories, Deal St., Halifax. [6348

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F.N.

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—F.N., 1913, 5-6h.p., 2-speed, clutch; 27 gns. [6263

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2h.p. Grandex-Precision, reliable lightweight; only £22/10.—Wauchope's, 9, Shoe Lane, London. [6457

2½h.p. Grandex-Precision, 2-stroke model, nice small mount, 2-speed gear; £27/10.—Wauchope's, 9, Shoe Lane, London. [6471

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Grandex-Precision, 1914, 3½h.p., 2 speed, clutch; 22 gns. [6264

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HARLEY-DAVIDSON Combination, 1915, splendid condition, spare tyre and sundries; £65, or very near offer.—To be seen at 7, Bawdale Rd., East Dulwich, S.E. [6497

HARLEY-DAVIDSON, genuine 1917 model, military finish, genuine H.D. sidecar, electric equipment, exactly as new; a bargain, £120.—Maudes, 100, Gt. Portland St., London, W.1. [6446

HARLEY-DAVIDSON 1915 Combination, excellent mechanical condition but plating rather poor, all accessories, coachbuilt sidecar; £58.—Maudes, 100, Gt. Portland St., London, W.1. [6449

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HAZLEWOOD, 4½h.p. J.A.P. twin, 3-speed, clutch. C.B. sidecar; £39/10.—18, Gun St., Bishopsgate Av. 5366. [6389

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INDIAN, late 1914, T.T., clutch, Lucas King of Road, speedometer, horn, spare valves, chain, just enamelled, overhauled, tyres, mechanical condition good; stamp, particulars; genuine.—Irwin, Apsley Terrace, Ilfracombe, Devon. [6390

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IVY-PRECISION Combination, 4¼h.p., 1914 model. Sturmey-Archer 3-speed gear, good condition; offers.—Proverbs, Electrotyper, Lionel St., Birmingham. [X5828

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RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—James, 1914, 4¼h.p., single speed, perfect, 29 gns.; James, 1914, 4¼h.p., 3-speed, renovated, 38 gns. [6267

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2½h.p. 1915 2-speed Levis, 2-stroke model; £32/10.—Wauchope's, 9, Shoe Lane, London. [6472

RIDER TROWARD and Co., 31 and 40h, High St., Hampstead.—Levis, 1916 Popular, 21 gns.; 1915 Popular, 19 gns. [6253

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Lincoln-Elk.

LINCOLN-ELK, 1914, 6h.p., countershaft gear, underslung coach sidecar; £45.—Motor Exchange, Horton St., Halifax. [6352

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Lincoln-Elk, 1913, 3½h.p., variable gear, waterproof Bosch; 19 gns. [6269

Matchless.

MATCHLESS.—Delivery from actual stock of M.A.G. and J.A.P. engined models; exchanges if desired.—Maudes', 100, Gt. Portland St., London, W.1. [5576

DELIVERY from Stock of the latest Matchless Combination, M.A.G. engine, spare wheel; £125.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

1918 8h.p. J.A.P. Matchless Combination, wind screen, electric light, 700×80 Palmer cord, spares, etc., not done 600 miles; cost £135, accept £120, or close.—8, Wendover Rd., Bromley, Kent. [6381

1915 Matchless Combination, M.A.G. engine, fully equipped, including Lucas electric lighting dynamo set, speedometer, excellent condition; £75, spot cash; no offers.—Millar, 49a, George St., Croydon. [X5458

New Hudson.

NEW Hudson, 3½h.p., 3-speed, and new coach sidecar; £32/10.—Motor Exchange, Horton St., Halifax. [6354

NEW Hudson, 1915, 6h.p., 3-speed, Ivy coach sidecar, splendid condition; 45 gns.—Port View, Dover St., Ryde, I.W. [6382

BIG Six 1914-15 New Hudson C.B. Combination, 3-speed, clutch, 3 lamps, etc., splendid condition; £45. A. Buckingham, 82, Collingdon St., Luton. [X5892

NEW Hudson 3½h.p. Combination, 3-speed, kick start, re-enamelled and plated, new gears and rings fitted, not used since; any inspection; £36.—Cameron, 47, Duke Rd., W.4. [6341

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—New Hudson 1915 6h.p. 3-speed coach built combination, chain-cum-belt drive, just re-enamelled, fine turnout; 54 gns. [6275

3½h.p. New Hudson, 1914 model, fitted with smart coachbuilt sidecar, 3-speed gear, clutch and kick-starter, includes accessories, price £45; also a 2¾h.p. 3-speed model, £32/10; any trial.—Wauchope's, 9, Shoe Lane, London. [6452

NEW HUDSON, 1914, 6h.p., 3-speed, clutch, kick-starter, driver from 2-seater sociable sidecar, Bosch, Binks, Jones trip, hood, screen, exhaust and foot warmer, beautiful turnout; £65.—129, Grove Green Rd., Leytonstone, E.11. [6488

New Imperial.

CROW Bros., Guildford.—New Imperial, all models, new and second-hand, in stock. [5371

2½h.p. 1917 New Imperial-Jap, 2-speed, clutch and kick-starter, as new; £45; guaranteed.—Wauchope's, 9, Shoe Lane, London. [6467

NEW Imperial-Jap, 8h.p., 3-speed War Model combination; 109 gns.; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3521

RIDER TROWARD and Co., 31 and 40h, High St., Hampstead.—New Imperial, 1916, 2½h.p., 2-speed, as new, 28 gns.; 1915 ditto, 25 gns.; 1914 ditto, 21 gns. [6274

NEW Imperial Motor Cycles, 2 speeds, clutch and kick starter, and lady's models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [6372

Norton.

NORTON Big Four, all chain drive; £82/10; in stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3524

TWO 3½h.p. Norton T.T. Machines, smart mounts; £40 and £45; fast and reliable.—Wauchope's, 9, Shoe Lane, London. [6465

NORTON Big 4, 1918, all-chain drive military model, countershaft 3-speed, kick start, as new; £69.—127, Vauxhall Rd., Liverpool. [X5871

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—Immediate delivery new 1918 Military Model Norton, Sturmey countershaft gears; £82/10. [6273

NORTON 1916 Sporting Combination all chain, 3-speed Sturmey countershaft, Bosch, speedometer, T..rs and all fittings, very fast, condition perfect.—Apply, Johnstone, Hillside, Bletchingley, Surrey. [6385

O.K.

RIDER TROWARD and Co., 31 and 40b, High St., Hampstead.—O.K.-J.A.P., 1916, 2-speed, clutch, 2½h.p., re-enamelled throughout; 26 gns. [6277

P. and M.

P. and M., 1914, little wear, fully equipped, grand machine.—421, City Rd., Birmingham. [X5826

LATE 1914 P. and M., with coachbuilt sidecar, 2-speed, splendid condition, run 11 months; offers.—Meckin, Egremont, Cumberland. [6379

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AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Procrastination as an Aid to Profiteering.

At the present time we, as a motoring journal, are suffering from two great handicaps, both of which are shortages of commodities of real national importance. The first is the shortage of paper; the second is that of fuel. The importance of the second is, however, so great that we intend to hold tenaciously to our policy of airing the question whenever possible, in spite of the shortage of paper. In all countries of the world, with the single exception of America, the shortage of motor fuels is now a very serious factor in everyday life. But, while some of the civilised nations have taken steps to meet this shortage and to provide a remedy against its recurrence in the future under any possible circumstances, it may be said that we, an insular nation, although suffering perhaps more, have done less than any other leading Power to prepare a remedy. It is certainly sickening—there is no other fitting adjective—to be continually told that Germany did this, that and the other, and that if we had only done the same we should have been better off now in nearly every sphere of our national existence. But, however unpleasant the thought may be, it has unfortunately a tragic foundation in fact so far as it concerns the question of motor fuels.

So long ago as 1887 all alcohol used in Germany for other than drinking purposes was granted absolute exemption from taxation. This step, so much ahead of the times, did not produce the desired effect, and in 1895 it was replaced by a progressive distillation tax. This was a tax levied on the products of the distilleries, and the revenue from it was used for paying a refund or bonus on the alcohol used in Germany for other than beverage purposes. In other words, the money necessary to lower the price of industrial alcohol was raised within the distilling industry itself. The result of this tax was that Germany made enormous strides in the production of industrial alcohol, and increased production led to a reduction in price. The scheme has proved a complete success, and has incidentally led to the cultivation of land that would otherwise have remained untouched.

We have before dealt with another aspect of German enterprise in its brilliant handling of the dye trade, and we have shown the importance of the dye trade from the nation's and from the motorist's point of view, because it leads to the production of home-produced fuel.

The use of alcohol as a fuel is still somewhat in the air as far as we are concerned in this country. We know that it can be used and produced in practically unlimited quantities. Nevertheless there are several obstacles to its universal adoption that have to be overcome. They can be overcome, and there is no doubt that in time they will be, but before this desirable end is achieved many years will elapse, and what is to happen to us in the meantime?

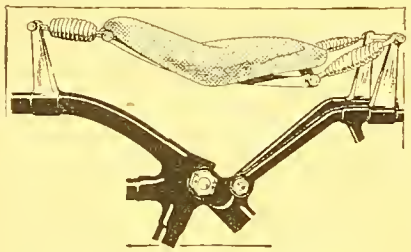
Only recently Sir Marcus Samuel has been lamenting to his shareholders that the increase in the price of petrol has not brought any increased profits to the company of which he is chairman, but we are rather inclined to agree with our parent journal, *The Autocar*, in accepting the statement with a grain of salt. And while it is only to be expected that profiteering in the motor fuel world will be as rampant as that in any other industry during war-time, there is one great difference between the motor fuel and, we will say, the food industry. Rank profiteering in the food industry is only possible when artificial conditions prevail, as they prevail at present. With the motor fuel industry, however, conditions are different, and so long as all the supplies of fuel are in the hands of one concern or group of concerns there is no reason why profiteering should not be as rampant in peace time as in war time. And especially, be it noted, in post-war peace time, when the demand for the goods that these concerns have for sale will be so enormously increased.

An Index to the advertisements in this issue will be found on the page facing the back cover.

IDEAS: Useful and Ingenious.

AN ORIGINALLY SPRUNG SADDLE.

THE Belgian who has sent us the accompanying design must have taken well to heart the lessons driven home by riding on his native roads. The drawing is practically self-explanatory, but we are afraid that the idea could only be used on a specially constructed machine.



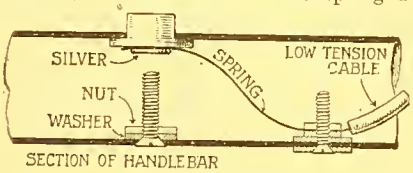
An interesting saddle springing arrangement.

The carrier, or rear section, of the frame is of the duplex type, and special vertical lugs are brazed on the two duplex members, as well as on the top tube.

A NEAT MAGNETO CUT-OUT.

BY means of the bone portion of an electric bell push, two inches of clock spring, two brass countersunk screws about one inch long, three nuts to fit them, an insulated fibre, wood, or ebonite bush, and a circular clip about threequarters of an inch wide, one of our readers, Mr. Ruddock, 3, Forest Lane, Stratford, London, E.15, has succeeded in making an exceptionally neat handle-bar switch.

The diagram is practically self-explanatory. To the end of the clock spring a piece of silver is soldered, which makes an excellent electrical contact, while to the other end of the spring a



A handle-bar switch.

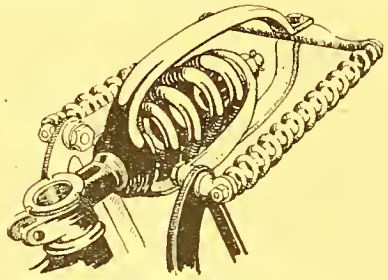
nut is soldered. Some little trouble may be experienced in fixing the end of the low-tension cable to the second nut, but if the end be looped, and the tightening done by means of a screwdriver from the outside, the difficulty is lessened. A clip, not shown, surrounds the handle-bar, and is used for keeping the push in contact when the machine is left idle, thus preventing anyone from starting the engine. A wire spring on the outside of the cable where it enters the handle-bar prevents the insulation from being chafed. The push is fitted as near to the handle-bar grip as possible, so that it may be readily operated by the driver.

A REBOUND SPRING FOR TRIUMPH FORKS.

IN the many interesting letters received from riders on Active Service there is a generally expressed opinion that the most troublesome detail of the excellent Triumph machine is its front fork spring, which is prone to breakages.

The D.R. is nothing if not resourceful, and he usually checks the violent action of his forks with a large strap from the steering head to the fork blades, while some go still further and fill in the interior of the "barrel" spring with long strips of old inner tube, thus making an effective shock "snubber."

Occasionally an artificer gets a brain wave and creates. Quite the most wonderful of these auxiliary devices the writer has seen forms the subject of the accompanying sketch, which was made



Fitting rebound springs on Triumph forks.

upon the spot where a large number of "crocked" W.D.'s were awaiting repair.

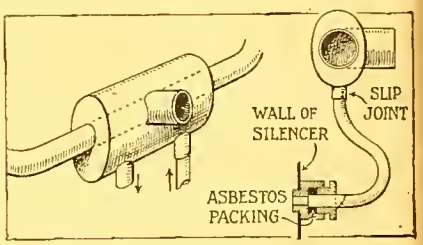
The sketch is almost self-explanatory. The large supplementary buttress is forged in one piece, and is secured to the head clip by the ordinary spring and nut. The buttress bolts at the top of the fork blades are replaced by specially made eye-bolts, to which are anchored a couple of lightweight "Douglas" fork springs, in turn connected to the cross bar in front.

It is obvious that a compression stress in the main spring is accompanied by tension stresses in the auxiliary springs and *vice-versa*, consequently the action should be very successful.

The whole device, despite an unavoidable obtrusiveness, is extremely well carried out, and speaks well for the originality and skill of those who are running and maintaining the military motor cycle under every imaginable difficulty.—WHARFEDALE.

HEATING INDUCTION PIPE.

THIS heating jacket is intended for use on flat twin engines, and greatly improves slow running, especially in cold weather. The jacket is fitted at the junction of the induction pipe with the carburetter connection. It can be made of sheet brass or galvanised iron, 28

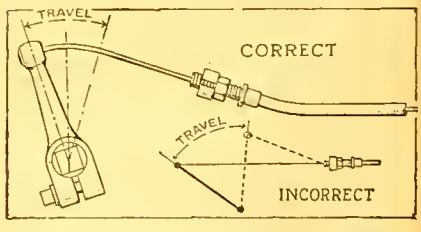


A heating jacket for use on flat twin engines.

S.W.G. Soldered joints are quite satisfactory. Cleaning the interior of the jacket is effected by washing with paraffin. It has been found that with a dry engine the exhaust gas exit pipe from the jacket can be left short (as on sketch) without fear of oily vapour spoiling the rider's clothes. The connection from the silencer, or engine exhaust pipe, is of ⅜in. inside diameter copper tube.

STURMEY-ARCHER CLUTCH ADJUSTMENT.

UNDUE wear on the Bowden cable can be obviated by adjusting the clutch operating arm so that it occupies in relation to the cable the position indicated on sketch. This position can be obtained by the use of a packing piece of brass between the clutch push rod and the



Adjusting clutch operating arm to avoid undue wear on the Bowden cable.

threaded clutch operating member. The stop for the cable adjusting nut should be turned until it is at right angles to the line of the cable.

Heavy oil, if heated in a suitable vessel, can easily be poured through the small filling cap on the right-hand side of the gear box; otherwise, without a grease gun, filling with cold oil is a tedious business.—E. STEVENS (Japan).

BY IXION

A New Gear Control System.

THE other day I tested a system of gear control which is perfectly familiar on cars, but which, as far as I can trust my memory, is novel on motor cycles. Briefly, it is a duplicate of the well-known Ford system. A two-speed gear is controlled by a pedal, so that top gear is engaged whenever the single pedal is released; with the pedal partially depressed, the clutch is freed; with the pedal fully depressed, low gear is in operation. Of course, such a simple—I had almost said "crude"—system of control will not appeal to the four-speed gate merchants, but I am by no means certain that it is not the goods for the "popular" type of quantity machine for which many people sigh, and which would unquestionably sell freely if it ever materialises. Such a gear is cheap to make, and about as foolproof as a control can be. It was supplemented by a locking device for free engine position, *à la* Ford. Incidentally, it is also a sound fitting for the two-speeded speedster mount, which should not compel the hot-stuff rider to remove a hand from the bar when he is gear changing. On the other hand, mountain tourists and sidecar men would resent keeping a foot pressed down hard during long climbs.

Mr. Dean Barry on the Single-cylinder.

SURELY the whole of Mr. Barry's arguments for the single against the twin miss the real point at issue. No sane man would contest the single's superior record in competitions. I, as a twin enthusiast, will go further in that sense than he does, and say that if I were competing in a six day trial to-morrow, or reporting it for *The Motor Cycle*, I should most certainly take out a single-cylinder. My reasons would be (1) time is precious, and I would rather have one plug, two valves, etc., to attend to against time than two plugs, four valves, etc.; and (2) that the single-cylinder is the older and more developed type, and therefore fractionally more trustworthy under strenuous conditions. Nevertheless, I seldom use a single-cylinder under ordinary circumstances, because it is comparatively uncomfortable. Competitions take no account of comfort. They may compel you to fit a spring fork, though such a stipulation is rare: but the refinements of balance are clean outside the judge's purview. Car owners boycott the single-cylinder not because it is slow or unreliable or a poor hill-climber, for it is none of these things: but because they prefer the reduction of vibration and the more continuous exhaust of the four-cylinder. The indictment which the general public brings against motor cycles is that they are uncomfortable and that the exhaust noise is unpleasant: the multi-cylinder scores in both respects. Nor is there any reason why the multi-cylinder should not be developed until it is as trustworthy as the single. Given the same attention from firms of the same class it will reach a similar standard.

One and Two Cylinders in Sidecar Trials.

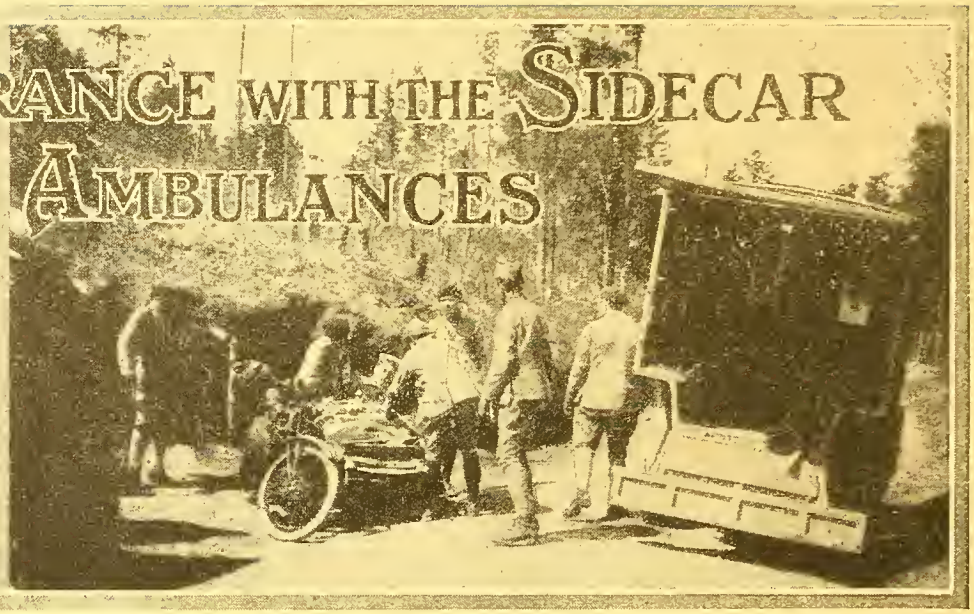
I PARTICULARLY deprecate any comparisons between the records of single and twin-cylinder sidecar machines in competition. Every experienced trials rider knows that the paper statistics are quite useless as data on this point. In the first place, there were not many riders in the country who could coax a 500 c.c. single sidecar through a six days trial; the engine needed very careful nursing indeed, and any repairs had to be done double quick, or the outfit fell behind schedule time. As a consequence, the percentages of success or failure were grossly illusive. A Hugh Gibson literally carried such an outfit through a trial and fools jumped to the conclusion that anybody could repeat the feat. On the other hand, quite an ordinary rider could hope to secure a gold medal with an 8 h.p. sidecar on one condition, and the decisive condition was whether the sidecar frame broke or not. These high-powered outfits were too fast and too structurally feeble to survive 1,000 miles of really bad going except in very judicious hands. I can remember more than one trial in which every sidecar entrant had structure troubles wholly unconnected with the engine.

Sidecars in Trials.

TO sum up the record of sidecars in competition, one might say that single-cylinder outfits have always been unfairly handicapped by the time and speed regulations. A 500 c.c. outfit in mountainous country is appallingly slow. Given decent luck, a first-class driver can just maintain a 20 m.p.h. schedule, and no more; to succeed, he must enjoy excellent fortune with his tyres, take regular risks at corners and on down grades in order to catch up time lost on the climbs, and his engine must be in very special tune. To win a gold in a six days with a 500 c.c. engine of any type is a personal feat standing to the credit of the driver rather than his mount. But if the time schedule were slowed down to rational figures any old driver could get a gold every time. On the other hand, a similar performance by an 8 h.p. twin depends chiefly on the strength of the sidecar frame. In the latter case the pattern of engine hardly enters into the matter; in the former case, the capacity of the driver is decisive. It may be argued that Gibson, Bischoff, and the other 500 c.c. sidecar cracks never put up a show with a 500 c.c. twin. The explanation is very simple—in those days there was no real demand for 500 c.c. twins, because the campaign for comfortable and luxurious motor cycling was in its infancy.

IN FRANCE WITH THE SIDECAR AMBULANCES

CRITICISM FROM A MECHANICAL AND A HUMANE POINT OF VIEW BASED ON EXPERIENCE.



Doctors attending to a wounded poilu at a front line dressing station. He has been brought from the trenches in a sidecar ambulance, and is being transferred to a waiting car.

SIDECAR stretchers have long been used by the British Ambulance Committee in the mountains of the Vosges, and now that their usefulness is more fully realised by the military authorities they are slowly becoming recognised as a part of the desirable equipment of an army. They are cheap, they are quick, they can negotiate roads which are quite impossible for a heavier vehicle, and, owing to the small mark they present, they can venture nearer the lines than can a heavy automobile. The sidecar, indeed, has its distinct place in ambulance transportation. It belongs to the front line dressing station from which, during the normal condition of things, men are to be evacuated in ones and twos rather than in sevens and eights. From the front line men are evacuated to the larger dressing stations further in the rear, which act as "casualty clearing stations," whence the cars can carry their full loads to the base hospitals.

Why not Interchangeable Stretchers?

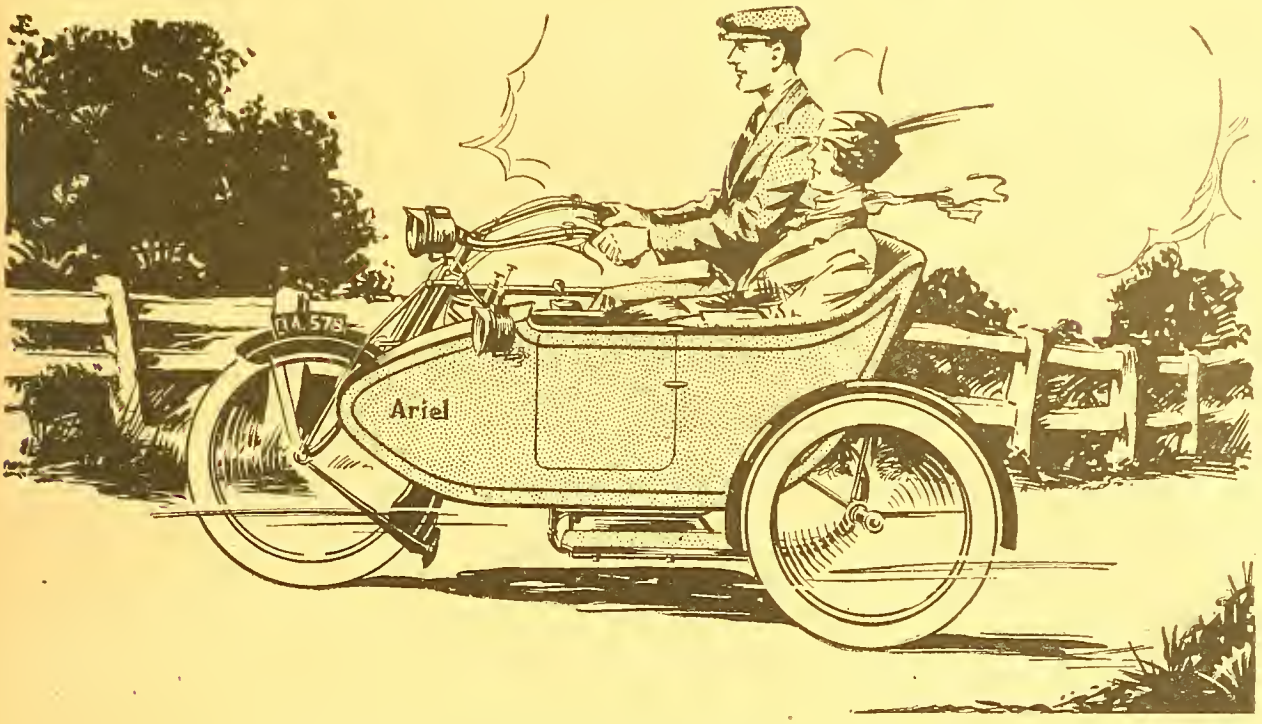
The sidecar is not to take the place of the car ambulance; it works in conjunction with it, and apart from its daily work during quiet times between the three or four stations allotted it, there are frequent emergencies—especially in mountainous districts—when it comes in enormously useful. At the fall of darkness, for instance, a telephone message comes through that eight wounded men are lying at the post of X. X is on a little side road of its own—a road so badly pitted with shell holes and mangled by heavy traffic that it is impossible for a car to negotiate it. A motor cycle, however, having no differential gear, and being light and narrow, can not only make headway, but, with its hand-controlled clutch, can dodge the many difficulties and thus avoid shaking the life out of its wounded passenger. Thus two or three sidecars are despatched to X to transport the wounded to some point on the main route where the cars await them.

While on this point I would emphasise the very great desirability of interchangeable stretchers. The stretchers on the sidecars should always be interchangeable with those on the cars. Very often there are only two or three men to transport the wounded from the sidecars to the cars, and it is no easy matter lifting a wounded man who cannot bear to be touched when it is unsafe to show even the smallest light on account of adjacent machine guns. Such a removal, indeed, may even cost a man his life, whereas, had it been possible merely to transfer the stretcher, he could have been conveyed straight to the operating room with only one handling. It is to be hoped that the army, when reorganisation is possible, will standardise all its stretchers, so that it would be possible to carry a man from the spot at which he falls—first by the stretcher bearers, secondly by the sidecars, perhaps, and thirdly by the cars—without even his realising that he is being transported.

Again, every big base hospital can advantageously employ a certain number of sidecars to be at the beck and call of the doctors for handling isolated cases: and so there is no end to their usefulness and the economy they render possible under the normal conditions of warfare. Generally they prove not only cheaper and quicker, but more reliable than the cars—indeed, the writer could quote numerous cases when the sidecars have been on draught day and night owing to the cars having succumbed to the severity of the conditions, and the only vehicle that can compare with them for really hard work is the Ford car!

A Military Model.

It will be seen, then, that the sidecar functions chiefly as a connecting link between the front line and the point from which heavier vehicles can operate. Taking the Vosges mountains, for instance, the sidecars almost daily save the lives of badly wounded men. Before they were instituted it was customary to trans-



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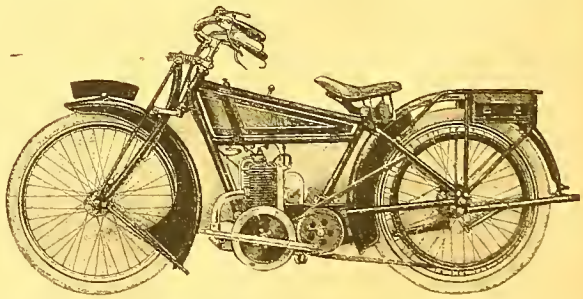


APPLICATIONS ARE INVITED FOR POST-WAR AGENCIES.

A13 *In answering these advertisements it is desirable to mention "The Motor Cycle."*

In France with the Sidecar Ambulances.—

port the wounded by hand, by bullock carts, or by chariot, from the trenches to some point the cars could gain. Often two or three hours were lost over a journey which a sidecar completes in twenty mintues, with the result that the unfortunate victim was either dead when he reached the hospital or too cold to survive his dressing.

The only ambulance sidecar with which the writer is familiar is the 8 h.p. J.A.P.-engined Sunbeam.

Suggested method of springing a sidecar stretcher, the system incorporating instantly adjustable friction shock absorbers.

This machine is doubtless the best that exists for the work, and the selection was a wise one. The metal-to-metal handle-bar clutch is the only thing for the purpose. A clutch which could be destroyed by heat would be absolutely useless. Sometimes for half an hour on end the machines have to plough their way over abominable roads, thick with mud, boulders, or snow, and presenting numerous house-side gradients. Of course, it is all low gear work under such conditions, and one uses the clutch to just the same extent as one uses the throttle. For a solid half-hour on end, then, the clutch is slipped with the engine pulling its hardest, till the chain case becomes too hot to touch. The clutches are used dry by most of the riders, it being found that the thin film of oil between the plates is a matter of theory only, and all it is ever necessary to do to them is to renew one or two warped plates during the periodical overhaul. Also the military Sunbeam has the good ground clearance and the infallible system of transmission that the work demands.

The Engine.

The J.A.P. engines have proved marvellously reliable. Six miles of continuous low gear grind under heavy load is nothing out of the ordinary, practically all the work being done on low and middle gears. They become hot, naturally, but there is no perceptible loss of power. The whole of the work, indeed, is abuse rather than fair use, yet practically the only troubles experienced with the sidecars are tyre troubles. Ambulance work, however, demands one or two special features, which may not be regarded as necessary for an ordinary touring machine.

The Sidecar.

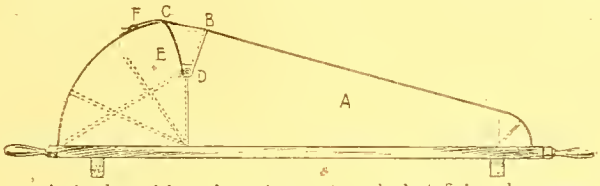
The stretchers are not sufficiently well sprung. If the man who designed their springing were made to ride a machine over a mile or so of front line road with a man having a broken thigh on the stretcher, he would be a sadder and more thoughtful man, as the novelists say. The springing is simple and reliable, but it is almost solid. What the wounded suffer on bad roads is beyond belief. Moreover, time is lost through the rider having to creep, and his nerves are knocked to bits by the haunting cries of the passenger. We must have long, curved springs, and in addition some device for steadying the rebound of the stretcher is vastly desirable. It is this quick rebound which causes even greater pain to the passenger than the downward jolt. On a bad road, indeed, it is necessary always to mount a stretcher bearer on the carrier in order to steady the stretcher. I am of the opinion that coil springs, working in conjunction with a cantilever system as shown in my drawings, would prove the best, the pivots of the levers containing the friction discs which could be instantly adjusted by the rider as regards pressure.

Constantly trouble is experienced through the leaf springs breaking the bolts by which they are attached to the chassis, for one can imagine the strain which falls at this point when one wheel drops into a shell hole and the whole of the weight of the stretcher is suddenly precipitated in that direction.

As regards springing, however, what is required more than anything is a good spring wheel. A few of the original Mills-Fulford sidecars which went to the Vosges were so fitted, and they proved infinitely superior to anything since used. Not only were frame breakages unknown with them, but the wounded travelled in comparative comfort. Now frame breakages are not uncommon, which is owing chiefly to the rigidity of the modern chassis. Indeed, the only safeguard against a broken chassis is in the fitting of a very large tyre to the sidecar wheel, which can be run in a semi-inflated condition.

The Necessity for Large Wheels and Tyres.

The effect of the most efficient springing system is jeopardised unless large tyres are used. There is nothing like a large tyre on a large wheel for smoothing out the jolts, and while this feature may be desirable for the touring mount, it is infinitely more so for the ambulance. In the latter case it is not merely a matter of comfort, or even of avoiding human suffering—it is often a matter of human life. It is not a pleasant subject, but imagine yourself transporting a partly disembowelled man on a machine with small, board-hard tyres. Yet, if the tyres are small, it is necessary to keep them board hard on account of the roughness of the roads and the great weights carried.



A simple, quick, and weatherproof method of fixing the apron to the hood. Normally the apron A is attached to the hood at a point midway between B and C by means of turn-buttons, but when it is shrunk it will not meet. The extension B C D is then added to the apron. The stiff wire E, bent to the curvature of the hood, is fixed to the extension, so that the latter overlaps the hood, thus excluding rain The apron is held in that position by the strap F

In addition to the wounded man one has one's rifle and all the trench kit to mount on the sidecar, while the driver and a stretcher bearer are mounted on the machine carrier. Light car tyres are the only thing, though sufficient mudguard clearance must be left.

This is an important point. The stretchers are only just large enough to carry a man of medium stature, and when it comes to a number nine *poilu* there is nothing for it but to pile his kit on the top of him.

In France with the Sidecar Ambulances.—

Indeed, trouble has been caused in the camp more than once by a rider declaring his inability to carry kit in addition to a wounded man, and it would be of immense convenience if some provision were made for mounting a haversack, etc., at one end of the stretcher, it being comparatively simple to stow away a rifle.

Spare Wheels and Springing.

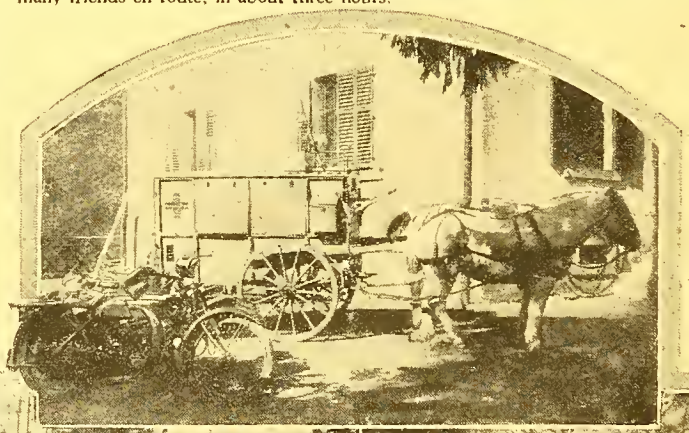
Then again, some better provision should be made for carrying the spare wheel in an accessible position. On most of the sidecars now in use it is necessary to remove the stretcher ere one could remove the wheel, and this is no easy task when under the machine guns and dependent upon star shells for light. Generally it has to be done amidst pouring rain and with some poor mangled wretch crying out to you in the name of God—Slowly! Slowly! Luckily the cries of a wounded man are one's best protection against machine gun fire—or at any rate that applies in the writer's sector. There is plenty of room for the spare wheel to rest, out of the way of mud, between the motor cycle and the sidecar, so that by unfastening two or three straps it could be donned without disturbing anything.

I have alluded to the necessity of always mounting a stretcher-bearer on the carrier of the machine. He is absolutely indispensable. The driver should have nothing to do but simply drive. If he is alone, and therefore compelled to desert his machine in order to give word of his arrival, he is sure to find something is missing on his return—his foot pump, or his spare gas mask, or a blanket. Again, a man is necessary for steadying the stretcher, for helping to haul the outfit out of shell holes, for jacking the machine on its stand in case of tyre troubles, or even for holding a desperate man down on the stretcher. Therefore some provision should be made for carrying him in a more or less humane manner. We do not want spring frames, unless they are light and infallible, but we certainly require spring carriers. Many of the boys have made devices of their own more or less efficient, and incidentally it is necessary that the carrier should not be dependent merely upon the mudguard for its vertical rigidity.

Spring seat-pillars would be a boon, since they do not add much weight or complication, but the one thing we do not want is the luxurious limousine outfit, having electric bell-pushes and telephones and foot-warmers. The machines are used rain, snow, or hail, often day and night, under the most appalling road conditions imaginable. At times they are caked with mud till hardly recognisable, and long spells of neglect are the common order. All the rider wants is absolute reliability. Gadgets of no kind are to be tolerated. It is not a picnic. A lighting dynamo is necessary, and in addition to the head lamp a very small bulb should be fixed somewhere in the front of the machine and near the road, for use in the danger zone where a powerful light is not permissible. It should give just enough light to enable one to see shell-holes four or five paces ahead, though the bulb should not be visible from either side, the light being concentrated downwards and ahead.

Finally, if the makers of the stretcher hoods and aprons would only allow for the shrinkage of the material, if they would place their turn-buttons in accessible positions, or, better still, dispense with turn-buttons and employ only straps, we should be happier and perhaps a little better. CHINOOK.

The old order and the new. One of the French ambulance carts, and alongside it a sidecar, at a base hospital. The sidecar will be back at the trenches within half-an-hour—the cart, provided the driver does not meet with many friends en route, in about three hours.



Stretcher bearers take charge of the passenger. The transferring of the wounded from one stretcher to another is a difficult and painful task, and the writer puts forth a plea for interchangeable stretchers.

"Where my caravan has rested." A sidecar on an Alpine track awaiting the return of its rider, who has gone to search for his passenger, and, incidentally, to find better shelter than is afforded the sidecar during an intermittent bombardment.

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Magnetos

Smaller; Lighter;
Greater Spark Energy
than any pre-war magnetos
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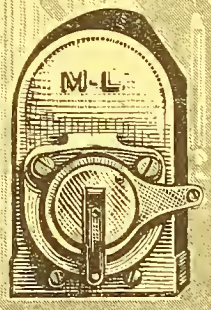

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WITH PERFECT POWER TRANSMISSION.

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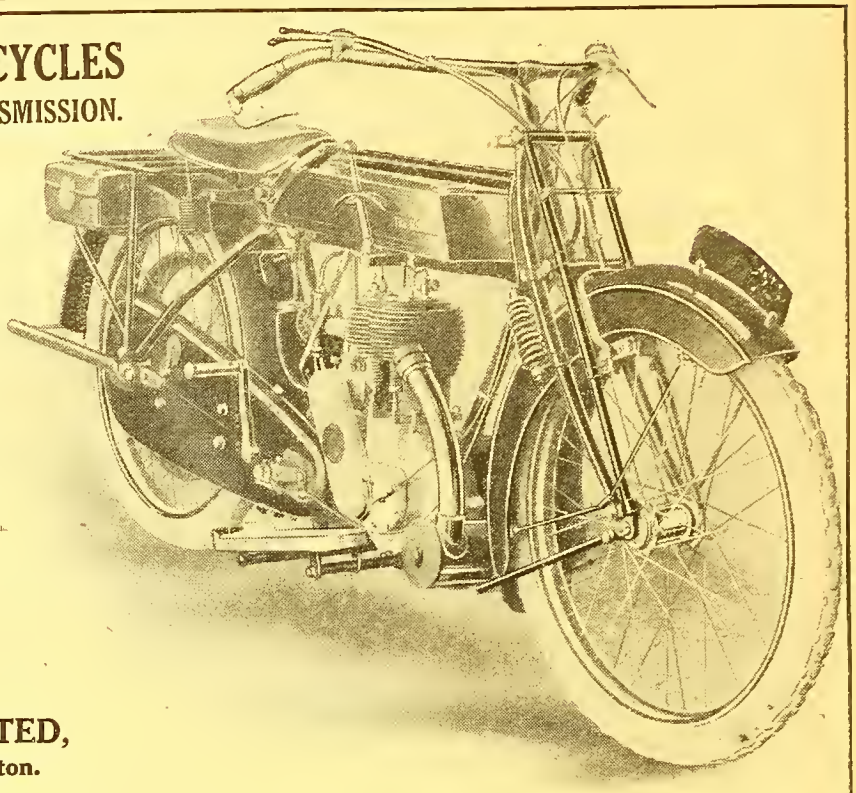

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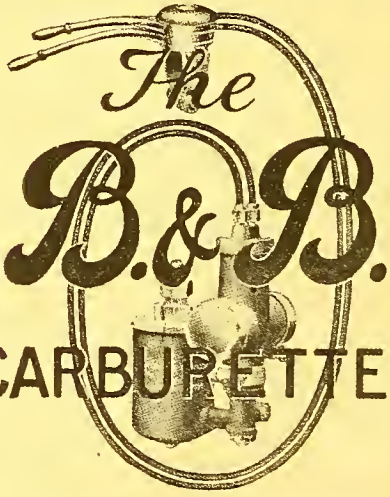

The B.&B. CARBURETTER

HAVE YOU OBTAINED A COPY OF OUR LATEST BOOKLETS ?

"HINTS & TIPS" (which deals mainly with four-strokes).
"ALL ABOUT TWO-STROKES" (which no two-stroke rider can afford to be without).

WE SHALL BE HAPPY TO SEND YOU EITHER OR BOTH POST FREE ON APPLICATION.

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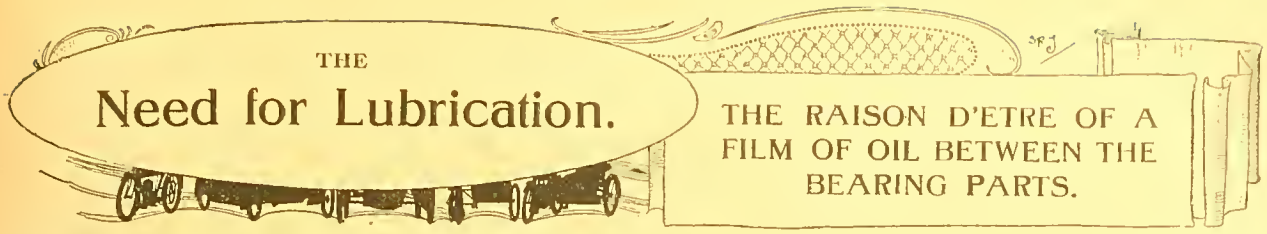


THE

Need for Lubrication.

THE RAISON D'ETRE OF A FILM OF OIL BETWEEN THE BEARING PARTS.

WHEN it is necessary for two metal surfaces to slide over each other either in a rotary manner as in a bearing, or with a reciprocatory motion as takes place between a piston and cylinder, the faces which come into contact are carefully machined and ground to within certain limits which are controlled by accurate metal gauges. To the naked eye, and even to the touch, the finish of the parts is perfectly smooth and may possess a decided polish.

The most perfect lathe ever made, however, will not produce a cylinder whose circumference is the outline of a mathematically exact circle. The error is microscopical, but nevertheless exists, and therefore when such a cylinder is caused to rotate inside a bearing the high places make contact with the internal surface of the bush, whilst the intervening hollows are held clear of contact. The resulting effect is that the hilly portions of the shaft carry the whole of the load with a consequent increase in friction.

The engineer is therefore concerned with a surface which, under the microscope, may present the effect of a series of more or less blunt knife edges or pyramids, the apex of each pyramid representing the parts on the shaft which will more nearly approach the inside circumference of the bush and constitute the supports for the load. The greater the number of these points, provided they are all of equal height, the greater the bearing surface. The actual size of the shaft and bush is not a haphazard guess on the part of the draughtsman, but is calculated with a view to the load to be sustained and the speed.

The Object of the Lubricant.

Now it will have been surmised from the above that even in the most perfect bearing hollows exist which are normally occupied by the lubricant. The lubricant, or oil, is necessary to reduce the coefficient of friction between the metal parts, permitting of easier rotation, and to assist in keeping the bearing cool. The "fit" of a bush on its shaft is arranged to allow of a film of oil existing over the whole surface of the bearing. This film is capable of sustaining pressure up to a certain limit beyond which the film is broken down. This limit naturally depends on the superficial area, the total pressure or load, and the perfection of fit of the parts. For example, if the total load be assumed as 1,000 lb., and the surface eight square inches, the pressure per square inch would be 125 lb., provided the whole area is in contact. Supposing, however, that faulty workmanship reduces the contact area to two square inches, then the same load can only be supported by increasing the pressure on the oil film to 500 lb. per square inch.

The same effect takes place when the supply of lubricant fails. Here the oil film is gradually rubbed away, absorbed by the pores of the metal or dissipated by the heat, and as it is not renewed the metal surfaces approach each other, and serious heating rapidly results. This causes the speedy evaporation or burning of the residue of oil and a seizure is inevitable.

Ball and roller bearings aim at reducing the friction by allowing relative motion to take place between the metal parts in contact, thus overcoming to some extent the necessity for an oil film. The ball or roller is in contact with a steel ring forced on the shaft and a second steel ring rigidly held in the bearing or crank case. When the shaft revolves the same relative motion takes place as occurs between a bicycle frame and the road when the wheel revolves, and therefore the friction is confined to the rubbing friction of the balls or rollers against each other. This is comparatively slight in a well-made bearing, and as in this direction the friction is almost unaffected by the load it is easily reduced to an inconsequent amount.

Some ball bearing manufacturers go so far as to advise the use of oil or grease purely to prevent rusting which would impair the perfect finish of the balls and races and deprecate their use from the standpoint of reducing friction. In support of this argument it is frequently found a new ball bearing in perfect condition is freer in action dry than when well lubricated with oil of ordinary viscosity.

How a Seizure takes place.

The seriousness of even a partial seizure will be understood when it is remembered the parts attach themselves so firmly together as to become one solid article at that point. It is therefore impossible to separate them without detriment to one or other of the parts. This property of attachment or welding under pressure is possessed by all metals in varying degrees, and is possible only when the pure unoxidised metals are allowed in perfect contact. Lead, for example, possesses the property in a marked degree. As is well known, this metal oxidises almost immediately when exposed to air at normal temperature, the silvery lustre of the freshly cut part rapidly becoming dull and discoloured, but if the untarnished surface be immediately brought in contact with a similarly clean lead surface under the correct pressure the parts easily unite to form a perfect joint. This method is frequently adopted in the manufacture of lead water pipes.

In a seized bearing the friction between the two surfaces prior to the seizure provides the cleaning process, and the pressure of the load is sufficient to provide the necessary force to unite the parts when the critical temperature (which may easily reach a high figure) has been attained.

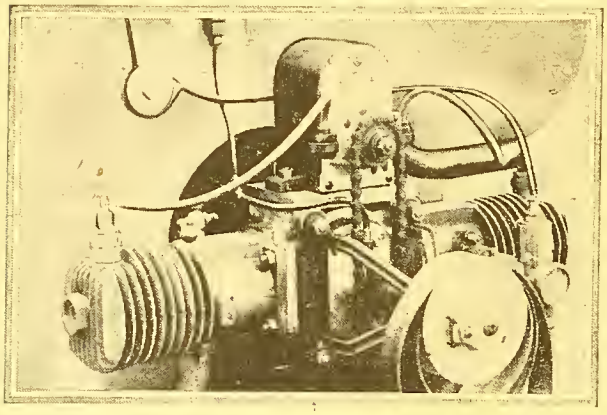
A partial or total seizure may be prevented by maintaining the oil film intact between all moving surfaces by consistent and adequate lubrication.

FRANCIS E. SCHOFIELD.

THE LEVIS POST-WAR TWIN.

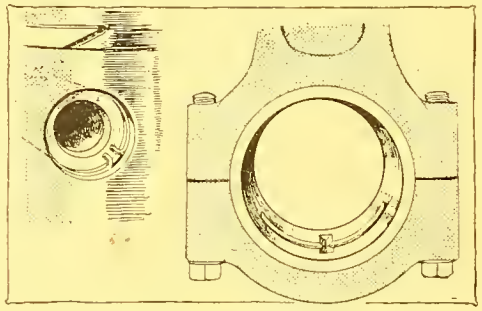
A Twin Two-stroke Engine which will Form the Power Unit of the Principal Levis Model.

WHEN the war started the Levis flat twin could hardly be called a well tried model, it had only "just arrived," but although it had undoubtedly come to stay, and during 1915 certain experimental machines scored in an unmistakable fashion at hill-climbs, it was not in general use. The engine unit proved to be just the article required for certain Admiralty uses, and it was adapted with practically no alterations, and is still being turned out in large numbers for a variety of war purposes, which we are not permitted to describe. Its continued use in these directions is sufficient proof of its reliability.



The Levis engine unit, as adapted for war purposes. Very few alterations are necessary for using it in a motor cycle frame.

The air-cooled cylinders, of 62 mm. bore × 70 mm. stroke each, give a total capacity of 422 c.c., and develop from 4½ to 5 h.p. The cylinders are offset ½in., with simple transfer ports cast integral in each. The aluminium crank case is cast in two parts; there is nothing unusual in its design—in fact, the whole unit is extremely simple: pistons with two top rings, connecting rods and solid crankshaft with plain bearings throughout are all of the usual Levis type. The gudgeon pin fixing is neat; the pin is shorter than the outside diameter of the piston, thus leaving a small recess in which is cut a circumferential groove to receive an expanding spring ring.



A neat gudgeon pin fixing and the cross grooving in the big end bushes which form an automatic oil pump.

Ignition, Carburation, and Lubrication.

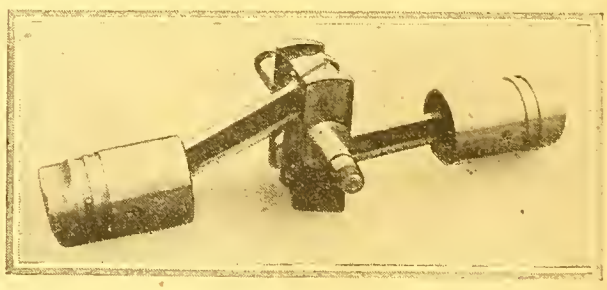
A single lever Binks carburetter is fitted at present; it is attached directly to one cylinder, the gas being inducted to the crank case when the pistons travel outwards; the usual two-stroke cycle then takes place, both cylinders firing together, for which purpose a special two-spark magneto is required—Thomson-Bennett is the make used. A two-pole plug run from a single-cylinder magneto is sometimes fitted.

The lubrication system is worthy of particular notice. The oil is led by ordinary drip feed to the mainshaft bearing and by drilled ways through the centre and crank webs to the big end bearings. The big end bushes have a circumferential groove cut in one-third of the bearing surface about ⅛in. deep; across the centre of each a second groove is cut at right angles to within ¼in. of each edge of the bush. Crank case suction acts upon the oil through the bearings in conjunction with the rotating grooves passing over the drilled oil lead. This sets up an automatic pump action which ensures a constant and effective supply of oil to both bearings. In fact, so certain was it in its action that the first experiments gave too heavy a supply because the right angle grooves were cut to the full width of the bush; the action was restricted by stopping these grooves ¼in. from each edge of the bush, there being sufficient suction through the bearing itself for all ordinary purposes. Experiments with throttle-controlled lubricators have been made.

Some Distinctive Features.

After seeing the running abilities of the engine we are naturally eager to test it in a motor cycle frame, and we have little doubt that it will prove a really good type of machine. The distinctive features are simplicity, easy starting, evenness of torque, absence of vibration, and good acceleration. On the question of petrol consumption, we can only say that, as at present used, it is reasonably economical, and it should prove quite satisfactory on the road.

Messrs. Butterfields, of Stechford, Birmingham, the makers, have also a water-cooled model in use at present, but whether it will be used for motor cycles or not is undecided. The smaller Levis singles will remain much as before. Enfield gears are found to be very suitable, and are likely to form a standard fitment. Levis productions will undoubtedly find many satisfied purchasers after the war, for the efficient lightweight two-stroke, either single or twin, despite certain acknowledged faults, will continue to command a big market, if for no other reason than its simplicity.

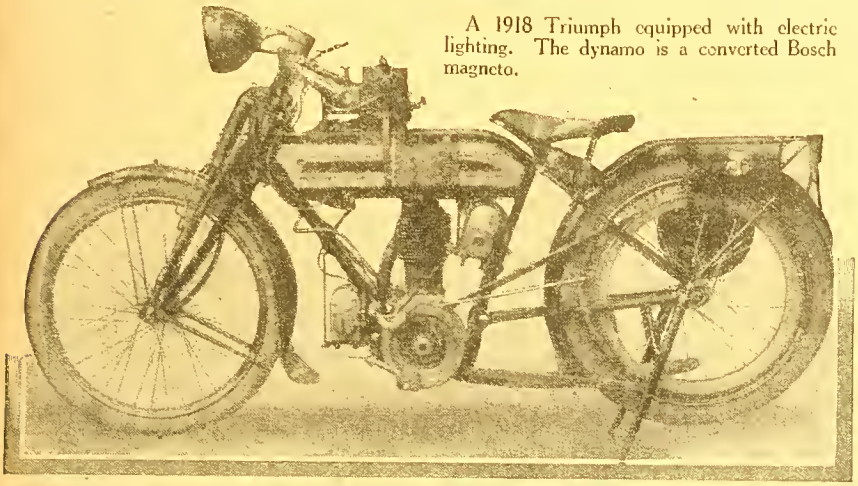


The Levis pistons, connecting rods, and crankshaft. Note the divided big ends.

ELECTRIC LIGHTING FROM A CONVERTED MAGNETO.

THIS interesting illustration has been sent to us by Lt. C. S. Burney, R.E., well known before the war in connection with Messrs. Burney and Blackburne, and one of the original B.E.F. despatch riders.

The machine in question is a 1918 Triumph, fitted with Rudge forks and an outside flywheel. It is equipped with



A 1918 Triumph equipped with electric lighting. The dynamo is a converted Bosch magneto.

dynamo lighting, the dynamo being a converted Bosch magneto. The luggage carrier has been altered, and on the top tube there is carried an accumulator with a change-over switch.

The same dynamo, Lt. Burney tells us, can be used with the gear box in position, and it is driven by a chain off a Douglas sprocket, which is screwed on to the inside of the Triumph driving sprocket. The drive is enclosed by a brass guard. The dynamo gives six volts, and illuminates a Lucas head light quite satisfactorily.

ROAD RACING IN SOUTH AUSTRALIA.

THE M.C.C. of South Australia held its 100 and 200 miles road championship recently, and as a result of the run, a public concert and tea, etc., no less than £130 was handed over to various patriotic funds. The results of the racing were as follow:

CLASS 1 (100 MILES). Solo machines up to 300 c.c.—1, V. P. Elliott (Elliott-Villiers). Time, 2h. 53m. 40⅘s. (34.5 m.p.h.).

CLASS 2 (100 MILES). Solo machines, 301-350 c.c.—1; C. S. Lindsay (Douglas). Time, 2h. 17m. 33⅘s. (43.6 m.p.h.). Record for South Australia up to 600 c.c.

CLASS 5 (100 MILES). Passenger machines up to 600 c.c.—1, L. Benisch (B.S.A. and sidecar). Time, 2h. 38m. 56⅘s. (37.7 m.p.h.). Record for South Australia for Class 5.

CLASS 6 (100 MILES). Passenger machines over 600 c.c.—1, C. Lindsay (Dayton and sidecar). Time, 2h. 29m. 42⅘s. (40 m.p.h.). Record for South Australia for Class 6.

CLASS 3 (200 MILES). Solo machines, 351-600 c.c.—Out of three starters all returned before second lap through various causes.

CLASS 4 (200 MILES). Solo machines over 600 c.c.—1, E. Furguson (Indian P.P.). Time, 3h. 48m. 5⅘s. (52.6 m.p.h.). Record for South Australia.

All the other competitors in this class rode Indian or Harley-Davidson machines, and out of five competitors who finished the course the first four were on Indians.

CONSUMPTION TRIALS IN AMERICA.

IN various parts of the United States there have been a series of motor cycle consumption trials, which are known as Conservation Trials, for the purpose of bringing the economy of the motor cycle before the public. The competitors were allowed a quart of petrol, and had to travel as far as they could on this amount. In Toledo, Ohio, the winner, Shaffer, on an Excelsior sidecar outfit, covered nineteen miles on the quart; Jameson, on a Harley-Davidson, was second; while D. Cristo and S. Bloom, both driving Harley-Davidsons, tied for third place. In the solo event, Henderson, on a Harley-Davidson, accomplished 28.1 miles on the quart of petrol; Sawyer was second with 25.6 miles, and McKelvey third with 23.8 miles, both mounted on Harley-Davidsons.

National Conservation Trials were also held at Aberdeen, South Dakota. P. N. Bushnell, on an Indian, covered 23.7 miles; the second place was taken by Baldwin (Indian) with 21.1 miles.

At Burlington, Iowa, the winning competitor in the sidecar class was Miss Lily Sudbrack, who drove her Harley-Davidson sidecar outfit 14 miles 864 yards on the quart allowance; Marquardt, on an Indian combination, was second with 14 miles 682 yards to his credit; and Stafford (Harley-Davidson) was third, just 67 yards behind him. In the solo event, the winner was Linquist (Harley-Davidson), 24 miles 461 yards; Lehman (Indian) second, and Wiele (Harley-Davidson) third.

At Cincinnati, Ohio, Uhle, on an Indian, ran 45 miles on his quart allowance, which worked out at 180 miles per gallon, and the machine was said to have been a stock one. According to the American reporter, "it must be the Cincinnati air that does it." Wehman (Indian) covered 37.9 miles to the quart, equalling 151.6 miles to the gallon; while Schiepf on a Henderson finished third with 37.4 miles to the quart. In this competition the first seven competitors averaged more than 100 miles to the gallon of petrol.

In Mason City, Iowa, Conservation Trials were held by the Federation of American Motor Cyclists (the American A.C.U.). All the entries were in Class 1 (high-powered machines). The winner, H. D. Thurtle (Indian), rode with full lighting equipment, horn, and speedometer, and covered 19.4 miles to the quart; the second prize was taken by Sparvin, on a Henderson, while Snyder (Harley-Davidson) was third.

It is interesting to note that the lightweight machines did not prove so economical as the more powerful types. The above are a selection taken at random of the results in certain States.

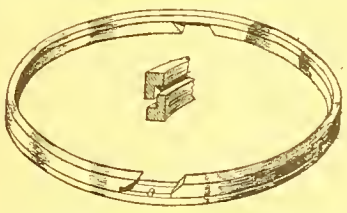
THE TIMING OF THE NORTON ENGINES.

PROBABLY owing to its bore-stroke ratio differing from conventional practice in motor cycle engine design, we receive more enquiries anent the timing of the Norton than that of most makes of machines. The owner of a machine having an 85 × 88 mm. engine usually has a friend who has had experience with engines of those proportions; but with an engine differing from most others on this point, with a bore of 75 mm. and a stroke of 100 mm. in the case of the 3½ h.p. Norton and 82 × 120 mm. in the case of the "big four," only other owners of such engines can give advice. Hence the number of "Norton" enquiries.

According to four diagrams handed us by the Norton Co. the timing of the 3½ h.p. model is as follows: Inlet valve opens dead on top, closes 11 mm. up compression stroke. Exhaust valve opens 16 mm. from the bottom of the power stroke and closes 4 mm. down the induction stroke.

In the "big four" model the inlet valve opens dead on top, closes 12½ mm. up compression stroke. Exhaust valve opens 19 mm. from the bottom of the power stroke and closes 4 mm. down the induction stroke.

From the above it will be seen that with both of these engines there is an overlap of 4 mm. That is to say, the exhaust valve is open at the same time as the inlet valve while the piston travels 4 mm. down the induction stroke.



An ingenious double piston ring of American origin. When in use the gaps, of course, are closed, and as they are kept opposite to each other by a peg, the rings should be very effective in retaining compression.

CURRENT CHAT

Times to Light Lamps.

SUMMER TIME.

July	11th	... ...	9.43 p.m.
,,	13th	... ...	9.41 ,,
,,	15th	... ...	9.40 ,,
,,	17th	... ...	9.38 ,,

Four Cylinders.

There is a distinct interest being shown by the public as well as manufacturers in four-cylinder motor cycles.

In Germany.

It is stated in the German journal *Kunststoffe* that inner tubes are now being made in Switzerland from Japanese silk paper soaked in a form of wax.

Enamelling.

During the last few weeks we have come across several motor cyclists busy re-enamelling their sidecars—useful work for those who have spare time.

Pumice-stoning.

In re-enamelling, an important point to remember is that the degree of success attained depends to a very considerable extent on the amount of rubbing down before the painting is commenced.

Synthetic Rubber.

Flax and hemp soaked in rubber, paraffin wax and celluloid, layers of calico steeped in rubber, and specially-treated strips of leather, are being used in Germany in that country's search for a rubber substitute.

The Jeremiahs and the Optimists.

Many are the views aired on the question of motor cycling after the war. A few Jeremiahs prophesy a lamentable state of affairs, but the general air of optimism pervading the whole motor cycle world is distinctly cheering.

Fuel.

The attention of readers is called to our leaderette this week on the fuel question. It is only by airing and discussion, and then discussion and airing, to be followed by more airing and discussion, that attention can be concentrated on this all-important matter.

When the attention is there, and the real seriousness and importance of the question and the situation have been realised, things may begin to get done. Talk alone will do nothing; but talk is the first step towards effective action, so let us have plenty of it until the details of action are more clearly indicated.

Petrol, Protests, and Profit.

At a recent meeting of the shareholders of the Shell Transport and Trading Co., Ltd., Sir Marcus Samuel said: "I feel at liberty to confide to you that we have made repeated representations to the Government protesting against the high prices charged to consumers for petrol, from which, please understand, we derive no benefit whatever. The price at which the article is sold is fixed by the Government, and all your company receive is a commission fixed by the Government."

The Altruists.

Our parent journal *The Autocar*, in commenting on Sir Marcus Samuel's remarks, practically says "We do not believe it." When one considers that the oil importers wished to raise the price of petrol on January 1st this year, and were only stopped by Government action, that the Government finally gave way to the companies on May 11th, that from June 1st a new scheme came into force by which our Government was to buy its petrol at a price fixed by the American Government, so that the price of petrol here largely depended on that settled by the American Government, and then when one thinks that the bulk of the Shell Co.'s productions come from the East one finds it difficult to disagree with *The Autocar*.

Special Features.

IN FRANCE WITH THE SIDECAR AMBULANCE.

D.R.'s IN THE JUNGLE.

The Silent Motor Cycle.

"Silence in a motor cycle is not an unmixed blessing," says our Scottish contemporary, *The Motor World*.

New U.S. Tax on Motor Cycles.

A new annual tax of $5 is proposed on all motor cycles in the United States, payable on date of purchase and every subsequent July 1st.

The Channel Tunnel Again.

Apparently a trip to the Continent after the war will be a much more enticing proposition if the Channel Tunnel scheme, voted on last week by the International Parliamentary Commercial Conference, becomes *un fait accompli*. The advantage to motor cyclists is obvious.

Overseas Trade—a Warning.

British motor cycle and accessory manufacturers of trade-named and trade-marked goods are advised that German agents are busy registering available trade names and trade marks as their own property, principally in South America.

"Stunter," a mascot of the Tank Corps. He is particularly fond of motor cycling and finds no difficulty in poising himself on the Douglas. Perhaps he found his Tank experience an aid in the gentle art of balancing.

THE MOTOR CYCLE AVIATION SECTION

New York.

New York City is darkened as an air raid precaution. The city appreciates the necessity for being ready for any emergency in connection with German U boat raiders off the Atlantic coast.

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U Boats and Aeroplanes.

The procedure is not so strange as it may appear, as it is rumoured that some of the large U boats are fitted with flight decks and carry aeroplanes or seaplanes, with a good supply of bombs, but this has not been proved as yet.

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Life of an Aeroplane.

It is stated that the average life of an aeroplane at the Front is one month.

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"Blinding" the Enemy.

A year ago 50,000 aeroplanes were talked about by some as sufficient to "blind" the enemy, but, in view of the short life of aeroplanes, it is now realised that this number is not so big as it looks, meaning only about 4,000 machines in the air constantly.

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State Engines.

A writer in *The Autocar* created quite a little commotion recently by a defence of the R.A.F. (Royal Aircraft Factory) engine. A defence of the R.A.F. engine was a thing that very few people ever expected to see in print, for it is—or was—a rigid law in the R.F.C. that R.A.F. products should be given names almost as hard as those now applied to the Yankee "Liberty" product. In fact, the main function of the new American "Liberty" seems to be to act as a shield for the old English R.A.F.

Counting the Bag.

In the early days of air fighting, no machine was counted as destroyed unless it fell in the lines of the army whose pilots claimed to have shot it down. Nowadays a machine counts to the score wherever it falls, provided there is independent evidence that it actually crashed, but no occupant of the conquering machine is accepted as an independent witness. Another machine, or some ground observer, must confirm the report. "Shot down out of control" means that a machine was seen to go down in such a fashion that its pilot was evidently unconscious or his controls were seriously deranged: but a definite "crash" is only reported when the impact with the ground is actually witnessed. This reserve became necessary, as pilots utilised the trick of going down in a spin when they had good reason to break off a fight. For the same reason, claims of having sent a machine "down in flames" are received with much suspicion, because in a dive oil enters the combustion chambers of the front cylinders in great quantities, and the exhaust resembles thick smoke, effectually concealing the true extent of the damage.

Petrol Capacity.

Motor cyclists hard up for a quart of petrol to take them twenty miles or so will be glad to hear that the tanks of some of our large aeroplanes contain no less than 900 gallons every time the machine goes up for a normally long flight. And yet some people expect, while this kind of thing goes on, still to receive petrol for visiting maiden aunts who live no less than 200 miles away.

—◇□◇—

What should he do?

In the *Scarlet Air Fighter* Richthofen recounts how a British pilot whom he had shot down continued to fire at the Baron with his machine gun from the ground, the crash having taken place behind the German lines. The Baron did not dive down and kill the Englishman, but his friend, Lt. Voss (since killed), afterwards told him that he ought to have done so. Lt. Voss was, of course, perfectly right. The victim had not surrendered, and the victor had a perfect right to retaliate.

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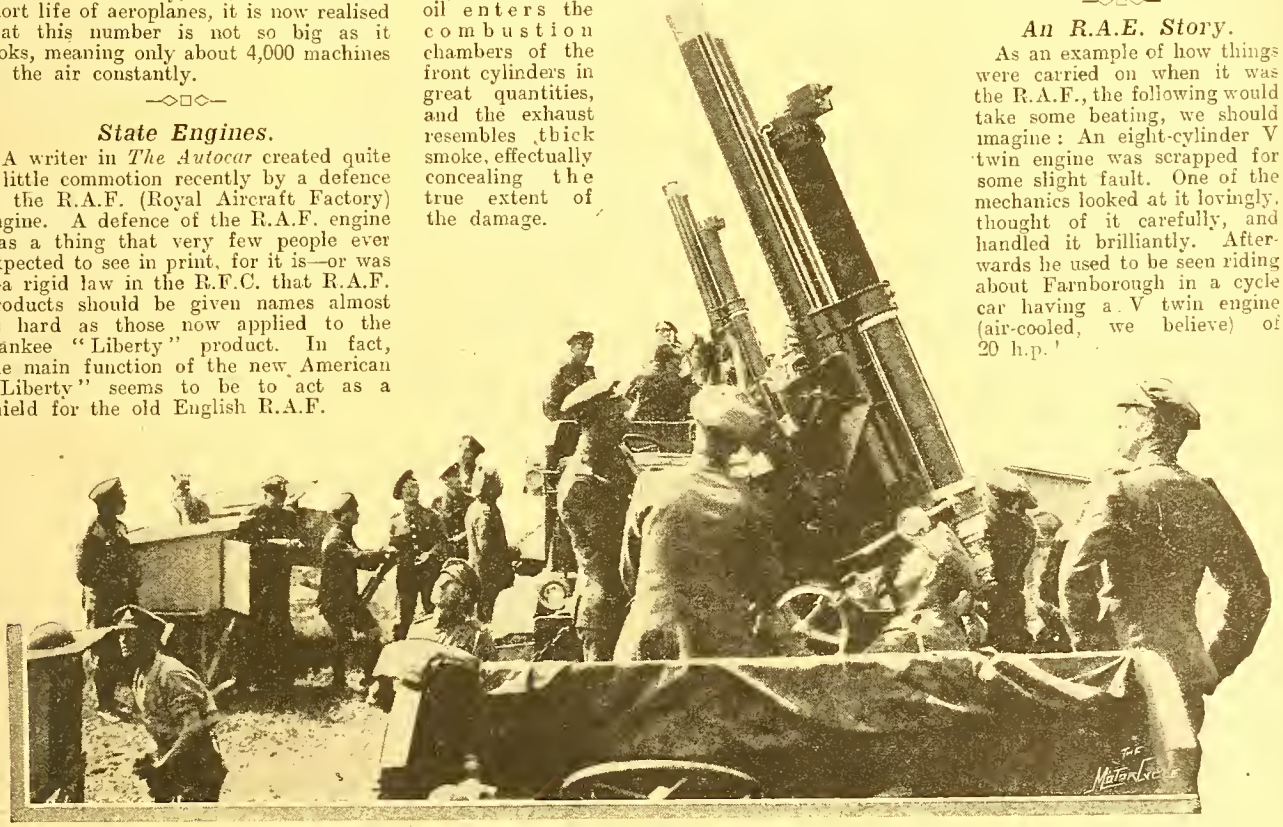
An R.A.E. Story.

As an example of how things were carried on when it was the R.A.F., the following would take some beating, we should imagine: An eight-cylinder V twin engine was scrapped for some slight fault. One of the mechanics looked at it lovingly, thought of it carefully, and handled it brilliantly. Afterwards he used to be seen riding about Farnborough in a cycle car having a V twin engine (air-cooled, we believe) of 20 h.p.



Anti-aircraft guns which recently brought down a huge German aeroplane in France.

STUNT FLYING

Our Contributor shews how a sudden slackening of speed is often of great service to the Air Fighter.

The nacelle of a Handley-Page aeroplane.

PART VI. By "Torque."

PROVIDED the analogy is not carried too far, aerial fighting in one of its aspects roughly resembles dodging at football. Just as a threequarter, running with the ball, tries to deceive and elude the back who seeks to tackle him, so a pilot must often dodge a swooping enemy. The threequarter's tricks are, however, comparatively limited in number and variety. He can run round his adversary: swerve past him: check in his stride, and let the back blunder past him: or jump clean over the enemy. In addition to the acrobatic stunts already described, the fighting pilot possesses one or two resources which perhaps hardly merit the name of "stunt," but which are at least as essential to long life and a pleasant catalogue of victories as the loop or the Immelmann turn.

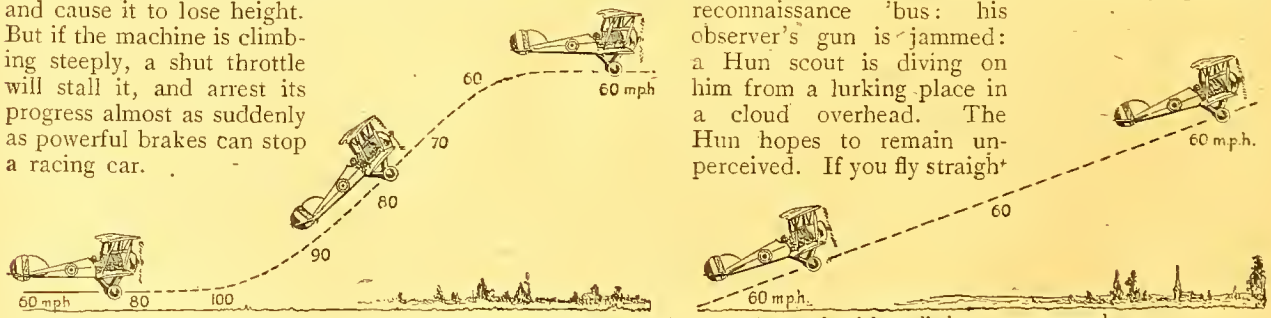
Sudden Throttling Down.

The first of them is extremely simple, and consists of nothing more than throttling down the engine. Your adversary's tactics are based, if he be a first-class fighter, on what he thinks you will do next; and he flings his 'bus into a position determined by the spot in space which he considers you will occupy in a few seconds, or a few fractions of a second. Closing the throttle does not necessarily produce a great alteration, and much depends on the angle which your line of flight makes with the horizontal. For example, if a machine is diving very steeply, its impetus and gravity will maintain the pace after the power is shut off. If the aeroplane is flying horizontally all out, shutting off the engine will slow it down perceptibly, and cause it to lose height. But if the machine is climbing steeply, a shut throttle will stall it, and arrest its progress almost as suddenly as powerful brakes can stop a racing car.

This particular dodge is possibly most useful when an enemy is roaring along all out in the same direction as yourself, and is either immediately behind you or at your rear and a little to one side. However quick the foe may be, he can hardly shut his throttle till a few seconds after yours is shut: and if he is really close up on your tail, that second or so should alter the position much to your advantage. If he is directly astern, the fear of a collision will cause him to zoom over you or dive under you: he will have to do it very, very quickly: he is likely to be flurried, and thrown off the lines of the scheme he had evolved for your destruction; and while he is regaining control and recovering from his surprise you can take the initiative. On the other hand, if he were to your left or right rear when you suddenly checked your 'bus, he will most probably shoot straight past you; in this case the positions are reversed: your guns now bear, and his do not; if you are very deft you may get in a burst.

Braking Effects.

A little imagination will indicate other positions in which the braking effect of a suddenly shut throttle may be useful. For example, a pilot is flying a slow reconnaissance 'bus: his observer's gun is jammed: a Hun scout is diving on him from a lurking place in a cloud overhead. The Hun hopes to remain unperceived. If you fly straight



The aeroplanes on the left illustrate the act of zooming, and the drawing on the right a climb at constant speed.

Stunt Flying.—

along your original course he will probably take it for granted that you are unaware of his presence, and he will plot his course to put a burst into you at a certain point on your projected course. Moreover, the Hun is coming down very fast, and will already have dived, say, 4,000ft. at the calculated firing point. You hold your course and speed till the flight paths of the two machines are about to intersect. Then you shut your throttle. Instead of your passing just under the Hun's nose, he now passes just athwart your bows, and it is you who fire the burst, and not he.

Childish as this trick seems, it has won many victories for both sides, the reason being that it adds another dodge to the fighting pilot's box of tricks, and so improves his chances of surprising the most far-sighted enemy.

Zooming.

A technical analysis of the "zoom" by Mr. W. G. Aston may be found in *The Motor Cycle* for April 18th. Sketches from his diagrams, illustrating the difference between a zoom and a continuous climb are here reproduced. They show that zooming is to the airman what rushing a hill is to the motor cyclist. In aerial fighting the upper position was at one time almost decisive, where two scout pilots of the same quality were concerned; the reason was that aeroplanes reach their maximum speeds when descending, and the pilot with the upper position thus possessed the real initiative either in attacking or in escaping. Consequently, in eluding a rush it was desirable to elude it by some method which put you above your assailant, and the zoom was therefore a stunt of prime value; incidentally, it could be utilised as the opening move in several varied stunts, and therefore helped to keep the enemy guessing.

Its special value has been somewhat reduced by the growing custom of fitting a third pivoted gun above the upper plane of scout machines. When these third guns were first introduced, the machine which zoomed often got very badly perforated through the "tummy" of his cockpit or fuselage. But it is by no means every pilot who can make good shooting with a "loose" gun, and considerable dexterity is required to switch the hands and eye over from the bow guns to the top gun, and to fire a deadly burst in the few seconds during which an overhead foe, who is stunting hard, is within the field of fire which such a gun mounting affords.

Daylight Bombing Developments.

By X.Y.Z.

LAST summer a fleet of Gothas bombarded London in broad daylight. They never repeated the audacious experiment, because Gothas do not court suicide. Immediately after this raid the defences of London were stiffened up. It was ringed in with "Archie" guns, capable of exploding shrapnel at 15,000 feet; and some of the adjacent aerodromes were provided with scouts which could touch 120 m.p.h. at decent altitudes. As a Gotha of the 1917 pattern cannot do better than 90 m.p.h., or reach a ceiling of much more than 12,000 feet, the raiding squadrons have wisely confined themselves to night raids ever since our defences were organised.

On the other hand, one or two of our bombing squadrons in France regularly visit Southern Germany in broad daylight. *En route* for Karlsruhe or Mannheim they have to cross broad areas which bristle with guns and house many squadrons of fast killer planes. Yet our raids continue, and the casualties we sustain in daywork are appreciably less than the cross-Channel Gothas experience in nightwork. What is the explanation of the contrast? Is not sauce for the Hun sauce for the Handley-Page?

The explanation is obvious. We evidently possess a limited number of bombing machines which can travel at heights where anti-aircraft gunners are practically innocuous. Very possibly our own Archies will be equally helpless when the rumoured four and six-engined Gothas come along. Over and above sheer height, we may guess that the super-bombing machine is also remarkably fast. The British squadrons which execute daylight raids have more than once fought off formations of hostile scouts, and even crashed several enemy scouts without losing a single machine in return. This point needs clearing up. It may be that a wedge of comparatively slow machines, each provided with a crew of several men and a field of fire which is only blanketed by the tail, is too tough a proposition for an attack by very fast scouts, with guns mounted so that they can only fire straight ahead. By daylight the squadron of giant machines can keep formation, and concentrate a terrific fire: by night it must break up into units, more or less, and darkness hampers its gunnery. On the other hand, it is conceivable that the flying speed of the latest bombers prevents even a scout from making rings round them. In either case, existing German defences are inadequate to stop daylight raids by specially designed machines.

Two interesting topics are suggested by these official reports. The first is whether we are nearing the speed limit for scouts. These machines have probably by now touched 150 m.p.h. in horizontal flight near ground level, and some of the heavy German models are alleged to have survived dives at nearly 200 m.p.h. The big multiple-engined battleplanes are being speeded up towards these gigantic velocities. If the stress of handling still faster single-seater projectiles proves too much for the human brain and physique, some of the functions of the scout may soon be transferred to two, three, and four-seated battleplanes.

In the second place, our daylight bombing machines are an audacious challenge to Fritz. If there is any vantage in the geographical aspects of raiding, it lies with him: for it is easier to cross the North Sea than to cross the trenchline and its hinterland. Now that we have set the example, it is easy for Fritz to build daylight bombing squadrons: indeed, in all probability he needed no lead in the matter, and is only a matter of weeks or months behind us in this form of construction. Obviously, we have not hesitated to give him a lead, because we know that the Allies can outbuild him.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

A POINTED QUESTION.

Sir,—Perhaps you would be kind enough to allow me a little space in your valuable paper to ask a very much talked of question.

It is this: Why do the members of the Auto Cycle Union Motor Messenger Detachment wear Sam Browne belts and clothing, as much like an officer as possible? Can it possibly be "swank" that causes them to make themselves look so ludicrous in the eyes of the Overseas despatch riders and the Army at large? A REGULAR DESPATCH RIDER.

LEAKAGE OF MAGNETISM.

Sir,—I read with interest the letter in *The Motor Cycle* of May 16th from "W.A." regarding magnetic insulation of the Dixie magneto. Being the owner of one, I have been subjected to periods of unreliability, and I hope that one of your readers or the firm interested will give some definite details, as there must be a great many reader-owners of Dixie magnetos who are capable of making a brass-centred driving sprocket themselves if it is beneficial to the magneto. Also, is there a safety gap in a Dixie, and if so, where?

Portsmouth. E.V.P.

CHAIN ADJUSTMENT.

Sir,—We have read with interest the letter published on page 594 in *The Motor Cycle*, June 20th. The device described and illustrated by Mr. S. G. Barnett is not by any means original, as it has been a standard fitment on the British Excelsior motor cycles, fitted with the Sturmey-Archer countershaft gear, since the autumn of 1915.

In our case, the bracket casting is provided with a special lug through which the adjuster works.

It is, as stated by Mr. Barnett, a simple and reliable chain adjustment. BAYLISS, THOMAS, AND CO.
WILLIAM H. CARSON, Director.

IN FAVOUR OF LIGHTWEIGHTS.

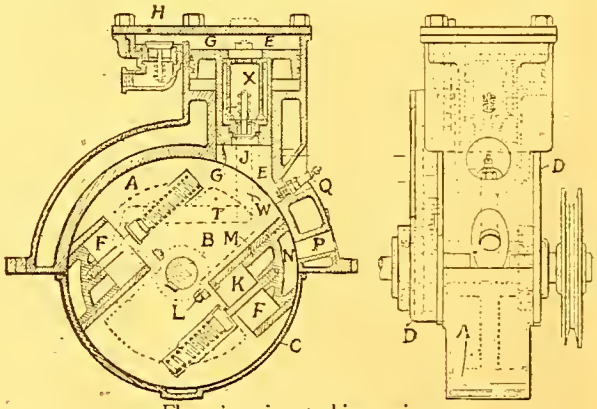
Sir,—I should like to know what weight limit Mr. Potts sets to a lightweight. Personally, I should say that the 2¾ h.p. A.J.S., though nominally of small horse-power, is in reality neither low in power nor light in weight. I fancy that the machine that won the last Junior T.T. turned the scale at over 200 lb., while, as to power, a motor cycle which is able to do a lap of the Isle of Man course in 47m. 18s. (47.57 m.p.h.) can hardly be called low powered. To most people the lightweight means something much less than this, say a 30 m.p.h. maximum and a weight of about 120 lb. I should class the 2¾ h.p. A.J.S. with the 3 h.p. Enfield (a machine which has served me very well) and the 2¾ h.p. Douglas, and call them medium weights. They are not little machines. T. KETTLE.

INTERNAL COMBUSTION TURBINES.

Sir,—The article on "Internal Combustion Turbines," published in your issue for July 4th, undoubtedly was of great interest to the rising generation of motor cycle engineers, who, as you say, appear to be fascinated by the problems of this form of engine. It would appear that, while the pure turbine may be a type of internal combustion engine we shall not see perfected in our lifetime, the rotary type, embodying sliding or reciprocating parts, is a more attractive proposition at the present stage of progress, if only because its problems are almost identical with those of the conventional reciprocating engine.

I send you a drawing of another engine of this type to add to your collection; it may also interest your readers. This motor was designed some time ago by a Mr. Flower, of Leeds. It consists of a rotor member A in a drum casing C having closed ends D D, a fixed cylinder E E, and a pair of revolving cylinders F F.

The fixed cylinder has a piston G of two diameters, the functions of this piston being respectively (1) on the in-stroke to induce a gas charge into the larger end of the cylinder past an intake valve H, and then to compress it in the smaller chamber of the cylinder; and (2) on the outward stroke to by-pass the charge from the larger into the smaller cylinder by means of the valve J, the induction valve H meanwhile being closed. The charge thus prepared is ready for being passed into one or other of the revolving cylinders F F, each being fitted with a loose sleeve K and designed so that they move slightly outwards, due to centrifugal effect of the revolving cylinders. These cylinders have a piston M, with an outer recess N to receive the compressed charge. When the explosion takes place, this piston is impelled inwards and gives motion to the rotor A, the gases expanding simultaneously. A buffer spring is interposed behind this piston to cushion the stroke and prevent the piston from striking the cylinder end.



Flower's recipro-turbine engine.

The outward stroke of this piston is completed by centrifugal action, which also assists the expulsion of the spent gases through the port P. The linkage for conveying the reciprocating motion of the piston to the mainshaft B is indicated by the broken lines. In connection with these parts, a double cam is employed to give a positive motion to and fro to the levers T and W. A. D. FREEMAN.

THE SINGLE-CYLINDER IN COMPETITIONS.

Sir,—I am overjoyed to see a champion arise at last for the best of machines, the big hefty single. I am with Mr. Hitchcock to the letter, though I have never had a Norton. I would certainly prefer a better drive than the plain belt to my 750 c.c. Rudge, but not so much so that I would part with the multi gear to have it. My machine has done 15,000 miles, all with sidecar, and has had no engine repairs—simply two gudgeon pins, piston rings, and a valve or two renewed, and I have never broken the Rich valve that Messrs. Rudge provide. While I was on leave in March before the "stunt" the machine ran well with plenty of power, and I had a delightful time.

I am one of those patient individuals who are carrying on with a good heart, hugging the past and dreaming of the future, and I wish I could say how much consolation and hope I get from the optimistic and British tone of *The Motor Cycle*. R. U. UDGE.

CAIRO TO JERUSALEM.

Sir,—In your issue of 14th March, under the above heading, I notice a short paragraph stating that a Church Army organiser had done a motor cycle ride from Cairo to Jerusalem. What I would like to know is, how he did it. I have been in Egypt for a long time, and have travelled exactly three times up the line, *i.e.*, since the taking of Gaza. I know perfectly well that when you come near Jerusalem you have roads of a description. But it is from Kantara up that I want to know about. Where did he sleep? Where did he get his rations—petrol, oil, etc.? What spares did he carry? The machine was presumably a Triumph. The shortest journey from the railhead (*i.e.*, Kantara) to Jerusalem is 300 to 400 kilos. I do not mean by the railway. When you get up the line a bit you have nothing but miles and miles of soft sand.

It is just about six weeks ago since I came to France from Egypt, so my papers of the 14th March and later have gone to Egypt and then followed me here, hence the reason of the delay in writing. Before finishing up, I may state that I am in the infantry, but have a good deal of motor experience in the Army. WILLIAM PITT.

FRONT BRAKES.

Sir,—I note in your issue for July 4th that Lt. Robinson thinks that American motor cycles score by having two separate brakes on the rear wheel. Now it seems to me that to place two separate brakes on the rear wheel is a confession of failure, and perhaps of weakness—of failure to design a satisfactory front brake, and of weakness because one rear brake should be ample for all purposes and absolutely reliable. Perhaps, however, the second brake is fitted to comply with British legal requirements, viz., that two separate brakes must be fitted, and not because a single brake on the back wheel is not considered to be all-sufficient. In that case the suggestion of weakness (of the rear brake) disappears, and we have only the failure to design an adequate front brake.

Surely this is not beyond the power of motor cycle engineers, either on this or the other side of the Atlantic. Admittedly the spring forks, especially many American designs, add to the difficulty of constructing certain front brakes and of applying most, if not all. Still, the obvious advantage of being able to apply braking power to both wheels when required should stimulate endeavour and lead to the perfecting of the front brake—at present a much-abused fitment, and often abused deservedly.

It may perhaps be as well to note in passing that it is not desirable that the front brake should be very powerful; certainly a sudden application should not have the effect of locking the wheel. JOHN HOLLAND.

TECHNICAL PAPERS WANTED.

Sir,—Thanks to your courtesy some twelve months back, we were able to bring before your readers a scheme for the collection and distribution of technical engineering and motor newspapers for distribution to the various units of the A.S.C., M.T., Overseas. From a large number of your readers and others we have received copies of papers, and this has enabled us to distribute each week a parcel of technical newspapers to the bases in France, Egypt, Mesopotamia, and Salonica, the last three bases having since been added to the original scheme. We are still receiving technical newspapers from those interested throughout Great Britain, and it is some indication of the comprehensiveness of the scheme that in France alone during the months of February, March, April, and May of this year, 1,100 papers were received at the base, these being made up into sixty parcels averaging eighteen papers each and forwarded to twenty-one different depôts. These figures refer to the French base only, and similar parcels have been sent each week to Salonica, Mesopotamia, and Egypt.

We would take this further opportunity of thanking those who have supported this scheme, and we shall be glad if they, and any others who still have back numbers of newspapers dealing with the motor or engineering trades, or as back numbers accumulate, will forward them, carriage paid, addressed to the Business Manager, *Motor Traction*, 20, Tudor Street, E.C.4. While we have a reasonably accumulated stock of parcels of papers with which we have been favoured, at the same time further parcels will be gladly received, in order to enable us to maintain our regular supplies each week.

THE MOTOR TRACTION PUBLISHING CO., LTD.,
R. A. OSMAN, Business Manager.

A snapshot taken in the courtyard of a Trappist monastery about fifteen miles north-west of Jerusalem. In the foreground can be observed a captured German motor cycle, a twin Wanderer. The rider of this machine, a German despatch rider, came coolly sailing along the road, blissfully unconscious that English troops were in close proximity. He rode right into the hands of an English mounted brigade. He was very calm, however, on being captured, and immediately handed his captors cigarettes.

REPAIRS.

Sir,—In view of the increasing difficulties of transport by rail and road, it cannot be too widely made known that repairs may be made promptly to lorries at a cost not exceeding £20, and to motor vans, cars, and motor cycles not exceeding £10, without priority certificates, provided the orders be accompanied by declarations as to the uses to which the vehicles are put. In this way, the delays incidental to certificates may be avoided, with manifest advantage to the community. Where the costs exceed these figures, applications for permission to order repairs should be sent to the Ministry of Munitions, Priority Branch, Caxton House, Westminster, S.W.1.

Briefly, the classifications are: Class 1.—Cars or motor cycles used by doctors, dentists, and veterinary surgeons for professional purposes. Class 2.—Cars or motor cycles used by officers of H.M. Forces exclusively for carrying out their naval and military duties. Class 3.—Motor vehicles used solely for the conveyance of goods. Class 4.—Motor vehicles licensed to ply for hire. Class 5.—Motor vehicles used for fire brigade purposes, motor fire engines, motor ambulances, and public works departments' services.

BARIMAR, LTD. (SCIENTIFIC WELDING ENGINEERS),
C. W. BRETT, Managing Director and General Manager.

MOTOR CYCLISTS AND THE ROYAL AIR FORCE.

Sir,—On opening my "Blue 'Un" for June 20th I saw two letters on this rather drawn-out subject which I have followed with considerable interest. The letter signed by "Five Pre-war Engineers" savours of self-advertisement, and it certainly should not educate the readers of your journal in the matter of the definition of a mechanic. "Northumberland Fusilier's" letter seems, to me, somewhat lacking in point.

To class motor cyclists as non-technical as against lorry and car drivers technical (without some excellent non-mechanical reason) is absurd. During the three years and ten months that I have been in the Army—three years and two months of that period Overseas—I have been driving ambulances, lorries, and light railway tractors. I have also been a D.R. and a clerk, to say nothing of odd jobs, and that in some dozen different units, and nowhere, in my experience, have I found lorry and car drivers encouraged to do their own repairs, or even tuning up, and in many cases they are not allowed to do so. On the other hand, while it is true that D.R.'s can always report their machine as unavailable for duty, when requiring repair, they are expected to do their own repairs as far as possible, and generally keep their machines in tune.

I may say that I hope soon to become a pilot in the Air Force, and that I appreciate the articles and notes on flying in the "Blue 'Un."

J. BRUCE.
B.E.F.

RICHTHOFEN'S DIARY.

Sir,—The article by "Torque" on "Richthofen's Diary, an appreciation (!!) of a German airman," is *surely* "writ sarcastic." I have read it through carefully, and fail to discover a *single* point on which anyone but a pro-German could find an excuse for "appreciation." "Torque" points out that the German airman fights in a most "careful" manner, to put it mildly, running no risks if possible, and always trying to be in greatly superior numbers when he does. He also states that this "lovable boy" (fancy a "lovable" German! imagination "stalls" at the effort) is typically Prussian in his opinion of his opponents; "extremely contemptuous" are his words. The British are "foolhardy and inexpert," the French "cowards and given to *shady tricks*" (*this* from a *German*, even a *lovable* one!)

Truly a sporting and lovable boy, this baby-killing Hun! "Torque" admits that the "diary" is "cunning and misleading" to the last degree, and is "smeared over with the slimy trail of the Hun propagandist," but then ingeniously tries to "camouflage" this fact by putting the responsibility on some "psychological underling."

Is the whole article another instance of the "Hidden Hand"? The sickly sentimentality and maudlin attempt to mislead your readers as to the true character of this hero of the "Richthofen circus" would lead one to think so.

Is "Torque" aware that this "lovable boy" is known to have on at least one occasion been the leader of the baby-killing raids on London, and also on Paris?

"Torque" gives no single instance or quotation from the diary of any act or expression that would warrant anyone in describing Richthofen as a "sportsman," much less a "lovable boy." Yet his article is headed "an appreciation." Will he tell us what we are to "appreciate"?

If "Torque" wants to read of an airman whom these adjectives *do* fit, let him read "Capt. Ball, V.C.," an *English* boy, and compare his sentiments, as evidenced by his letters, with those of the "crack" Hun flier, and then I think he will have the grace (if he is a Britisher) to be ashamed of his attempt to bolster up and glorify the filthy Hun, who still continues to show the world that "the only good German is a dead German."

GEO. T. WADDINGTON.

MOTOR CYCLING IN THE FAR NORTH.

Sir,—A correspondent of *The Motor Cycle* recently put forward a very valuable suggestion dealing with the institution of trials specially organised for the detection of excellence or otherwise of delivery-tune. New machines were to be selected from dealers' stocks, and special parts such as gear boxes, cylinders, etc., were to be sealed up. As a motor cyclist of no mean experience, with a good many thousands of miles to my credit, I may say that I hail this as a step in the right direction. To me, reliability more than any other consideration whatever is a prime—indeed a vital—necessity, and particularly reliability at delivery without the necessity for a few months' riding before getting all parts in order.

Doomed to cover a mileage of anything from 100 to 150 miles a week over the wilds of the Northern Highlands and Islands—some one-time motor cyclist may envy me, yet I can assure him that the journeys that come my way are no joy rides—employed on Government service of an important and generally urgent nature, I can never study weather, or seldom choose my route, and for these reasons speed is a matter of little consideration, and luxury of less, to me.

Some of your readers will know the road from Inverness to John-o'-Groat's, and can well imagine the feelings of anyone stuck near Helmsdale or Wick. Many will know the lovely grass grown road from Inverness to Kyle, without a single repair shop once Dingwall is passed. Few will know the road from Achnasheen by Poolewe, and along the coast to Ullapool, or back *via* Garve. Still fewer will know the Skye roads and the treachery of the loose shingle with which the islanders make attempts at road repair. Once in Skye (forty miles from my lodging) I was stuck for a day through a gudgeon securing pin becoming loose and dropping into the crank case. The "'bus" was only a few months old, but was passed on to another rider a few weeks after! Fortunately, with the aid of the local blacksmith, a substitute was made. Worst of all, perhaps, are the tracks of Lewis with their abominable surface, and those of Harris with their mighty hills and hairpin bends that would give a competition rider—*au fait* with Applecross—enough to keep him going. There is no road roller in these islands; rain (which is never absent for more than a few days in summer), snow, ice, and crofters' carts play havoc with the crust. Soft, peaty earth with a few shovelfuls of metalling thrown in are dumped thereon, and woe to the motorist who has to do the rolling.

From Stornoway to Tarbert—a distance of thirty-six miles—first over virgin moorland, then over a mountain pass high enough to be icebound for many weeks in winter, is a journey that would give many an experienced motorist a pang of nerves. The last twenty miles or so has hardly a house along it. If the machine should break down, the traveller must either effect his own repair, or hoof it to the nearest telegraph office, possibly ten miles away. In winter he will probably find himself in a blinding snowstorm. I have covered the distance a few times too many to be attracted even by the grandeur of the scenery or the opportunities for sport. To few motor cyclists is the necessity for reliability so vital, and I am sure that any action on the lines suggested by your correspondent would assuredly prove of inestimable value to the fraternity of motor cyclists.

The motor cycle which I am riding at present is a 3½ h.p. 1915 three-speed countershaft Ariel, to which I have attached a very comfortable sidecar. The machine has been fitted with T.T. bars and Terry links, and a few holes have been drilled in the silencer box. It has now a very considerable mileage to its credit, and has held together where heavy twins have gone off with broken frames or springs.

H. T. WILLIAMS.

TRAINING FOR INVASION.

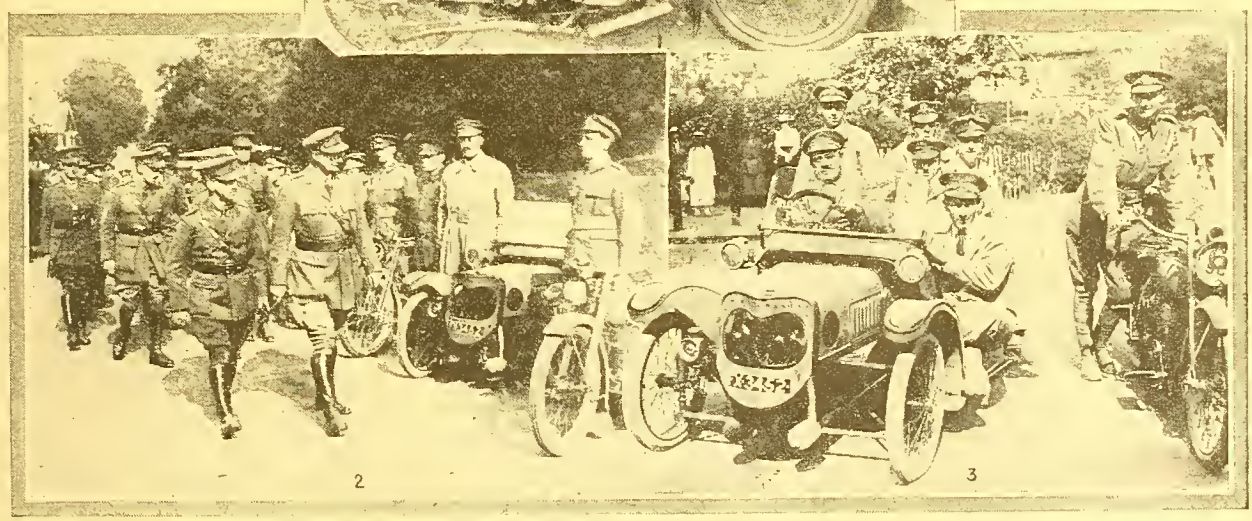
Middlesex Volunteers in Action.

REMINISCENT of the pre-war days of reliability trials, the Middlesex Motor Volunteers carried out a successful one-day enterprise last week in the form of a despatch carrying test. The competitors, of whom there were eleven, had to carry messages from point to point over some of the most difficult roads in the Kent-Surrey borderland, and it speaks well for the efficiency of the unit when it is stated that every rider succeeded in getting through. The feature of the event was the performance of Pte. Sharp on a Morgan cycle car. Sharp weighed sixteen stone, and had a twelve stone passenger up, but, despite this, he more nearly conformed to the difficult time schedule than any other rider, and won the contest with a total time loss of two minutes, one minute being lost on each of two despatches. Every other rider competed on a Harley-Davidson sidecar, and this called forth the suggestion that the unit should be called the Milwaukee Volunteers. The itinerary embraced Limpsfield (the start), Sevenoaks, Penshurst, Hever, Lingfield, Hartfield, Langton, and Sundridge, and included some steep hills and a very winding course. As a result it was no easy task to keep to the difficult time schedule framed. Nevertheless, the first three men only lost sixteen minutes between them, the other riders suffering very largely from tyre troubles.

Sharp, on the Morgan, had a trouble-free run, and, thanks to a remarkably fine turn of speed, was enabled to keep to time on one of his most difficult despatches despite having gone four miles out of his way on a wrong road. The course was arranged with a view rather to testing the map reading abilities of the competitors than to anything else, and there were remarkably few instances of the men going wrong.

The return journey was made *en masse* and with such decorum as to provide an object lesson in good manners on the road. The first six men were as follows: 1, Pte. Sharp, Morgan Runabout (2m. late); 2, Pte. Willshear, Harley-Davidson (6m. late); 3, Pte. Horne, Harley-Davidson (8m. late); 4, Pte. Wilson, Harley-Davidson (15m. late); 5, Pte. Clark, Harley-Davidson (31m. late); 6, Pte. Pike, Harley-Davidson (48m. late).

It is interesting to note that the first two men—Sharp and Willshear—are both members of the H.Q.C.D. (A.A. Section) of the Special Constabulary, and have had experience of active service riding on air raid nights.

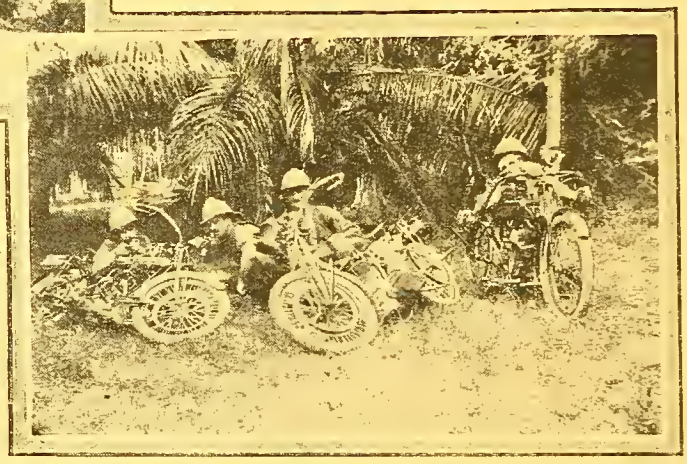


(1) The winner of the trial, R. Sharp (on right), receiving a despatch. (2) Major Valentine Smith reviewing the D.R.s. (3) The Morgan, which came through the trial so successfully, and the Harley-Davidson, which ran second.

In view of enquiries we receive from time to time, we again state that no priority certificate is required for repairs to motor cycles at a charge not exceeding £10, provided a declaration as to the use to which the machine is put accompanies the order, thus saving considerable delay. In cases where the costs of the repairs exceed this amount, application for priority certificates may be made to Ministry of Munitions, Priority Branch, Caxton House, Westminster, S.W.1.

DESPATCH RIDERS OF THE JUNGLE.

Some Interesting Particulars of the Conditions under which the Despatch Riders in German East Africa carry out their Work. By Two of Them.



D.R.'S IN "GERMAN" EAST AFRICA.

(Top) A sapper and his B.S.A. equipped for work with a column in German East Africa.

(Bottom) Although the despatch rider's life in East Africa is generally one long fight against the natural conditions of the country and against disease, the D.R.'s sense of humour is always in evidence, as the photograph shows. Cpl. Grant, Sprs. Day, Purdie, and Rudd in "The Last Stand." (The name of the film syndicate was not sent to us.)

AS old motor cyclists, we have read with great interest the experiences of despatch riders serving in various corners of the globe, as recorded in *The Motor Cycle*. Naturally, this has aroused in us a spirit of emulation, and we feel sure that our experiences in East Africa as Despatch Riders R.E. Signals will prove equally interesting.

We note that each writer claims that his respective front is the worst possible for our job. While not wishing to claim the palm for East Africa, we feel sure that the following *résumé* of conditions will cause the unprejudiced to realise that despatch riders on some fronts have not "the best and safest job in the Army."

Roads!

In considering riding in German East, one must first dismiss from one's mind all ordinary conceptions of a road. In this country it is often better to plunge through the bush rather than to follow the recognised track. Where the soil is sandy the road is at first a couple of cart ruts through the bush, the trees that may happen to stand in the way being cut down, leaving a stump about a foot or so high. After a few days' use by motor and animal convoys, this resembles a strip of seashore just above high water mark. The stumps become camouflaged by the loose sand until discovered by an exploring front wheel or protecting footboard. However the discovery is made, the result is the same. At other times the unfortunate D.R. has to follow a native track through elephant grass, which shuts out all view of his surroundings. This is not bad going, except for the facility with which one may mistake an animal track for a native one. Further on he may strike a belt of cotton soil and swamp, but as these are much the same the whole world over, it is perhaps needless to describe them. After a little rain, cotton soil presents a surface unrivalled for pure heartbreaking work. To begin with, mudguards must be dispensed with, or progress, owing to congested mud, is impossible. Even with mudguards removed, sufficient will collect in the forks to render frequent stoppages inevitable. Nor is this all. For sheer hair-raising skids a cotton soil track can beat creation. To prepare the tracks for further heavy traffic, a playful road corps lays palm tree logs, bamboos, palm leaves, and any other lumber across the track. A well-tuned box car may make as many as thirty miles a *day* over such a track, but the progress made by a D.R. is a matter not even for conjecture, but luck. Sometimes he finishes up in the car.

Formidable though this may seem, not half has yet been told. Dongas (sluits) thirty to fifty feet deep (in places) have to be crossed, the bottom usually littered with a choice selection of boulders, or, after a tropical shower, with a swiftly-running stream. In the latter case, machines have often to be carried across by natives wading waist-deep. The ordinary test hill rider would probably say that the sides of some of these dongas are impossible to climb, but they have to be and are climbed, although nervous moments are fairly frequent. In passing, we may mention that it took five of us over two hours to climb one bit of a hill about threequarters of a mile long. The mountain roads usually resemble the bed of a rocky stream, and, indeed, the channel made by the rain zigzagging from side to side resembles a crevasse in a mountain more than anything else.

Wild Beasts.

It must not be thought that lions, elephants, rhinos, etc., lurk behind every tree in order to pounce on the unwary D.R. or to block his way. Actually these beasts dash into the jungle before one has time to see them, and so far we have not heard of a well-authenticated instance of an encounter 'twixt a D.R. and the king of beasts. However, this does not lessen the trepidation of the unfortunate D.R. who, overtaken by darkness, is compelled to spend the night in the bush. Then, indeed, judging by the noise made around him by the denizens of the forest, he may well be pardoned for any extravagant story he may tell of "herds" (?) of lions, or nocturnal encounters with other carnivora. What causes more discomfort and disease is the multitude of insects with which the country abounds—ants who insist on sharing your rations, mosquitoes taking toll of your blood, "jiggers" using one's feet as a home and breeding-place, the tsetse-fly, whose bite is death to the beast of burden, and a multitude of others, who all combine to add zest and energy to life. Fortunately, the deadly scorpion, the tarantula, and the serpent tribe exhibit great aversion to us.

While we are spared the shrapnel and high explosives of France, the enemy practise the playful habit of ambuseade. A few weeks ago one of our crowd was fired on by a party of the enemy with elephant guns and soft-nosed bullets.

Despatch Riders of the Jungle.—

Fortunately for him, the German *askari* is not an excellent shot. Our man, however, was wounded in the hand, his machine burned, and he himself stripped of all his clothing, and left on the roadside. He eventually managed to walk into the next station, a mile or two away, but the D.R. is not always as fortunate as this.

At home we have often sighed for the equable climate of the tropics, but experience lessens envy. An average mean noonday temperature of 130°, with only a variation throughout the year of 10°, is sufficiently trying to wipe out the credit side. Along the coast belt both night and day it is hot, but among the hills a cold night succeeds a hot day, causing further worry to health.

Generally while at headquarters we feed fairly well, provided the rations can get through, but if attached to a column on safari, the D.R. must depend on what he can carry, often the rations being a cupful of mealie-meal and a handful of monkey nuts (this was the Christmas dinner of several of us). The all-pervading sand gets into everything. Water all over the colony is bad, and he who drinks it in its natural state runs great risk of being left behind a casualty.

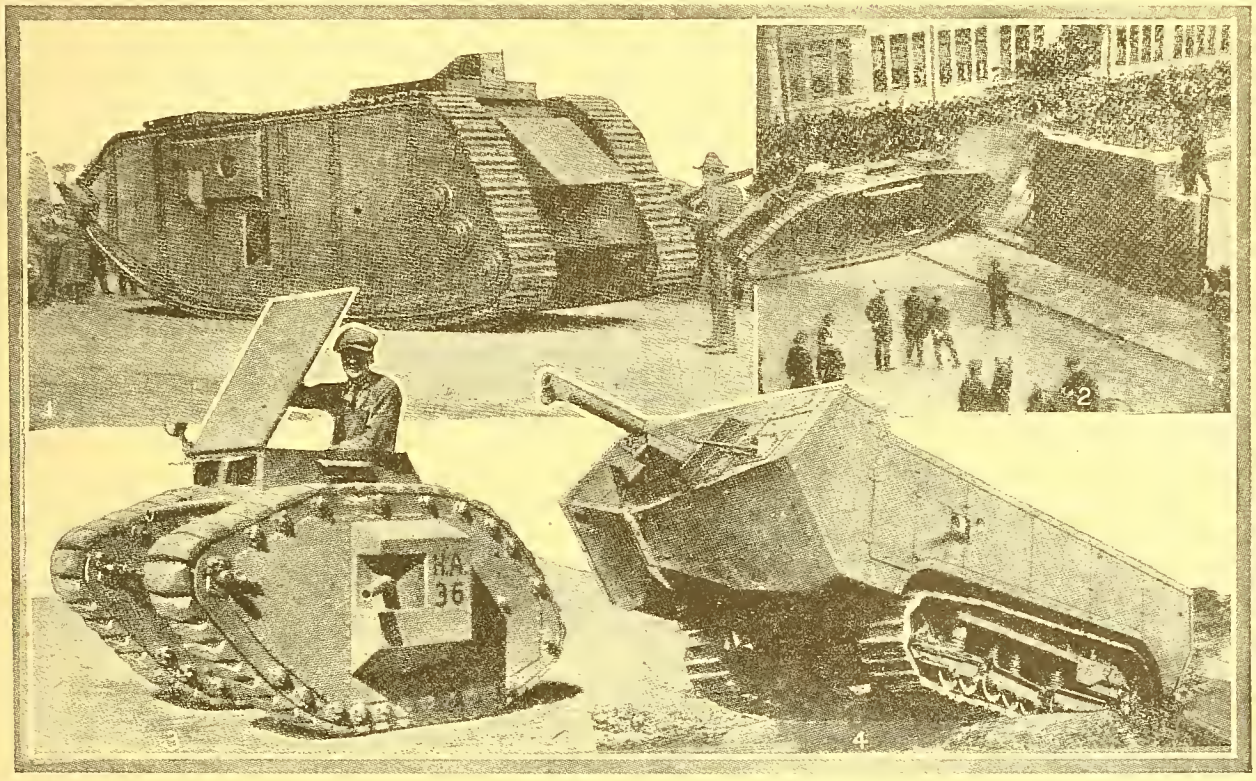
Under these conditions it is no wonder that sickness takes far heavier toll than the gas or guns of other fronts. Malaria is a constant companion to all who have been out here a few months; indeed, familiarity has bred contempt. Dysentery, enteric, blackwater, cerebral malaria, and spinal meningitis still try the best skill of the M.O., and too often prove fatal. All through, the campaign has been one long fight against nature and difficulties unknown before. We may not give figures, but on an average each man enters hospital once every four months.

We notice that most D.R.'s out East speak of riding through sand a foot or more in depth, with magneto platform and footboards ploughing up the track. We have come across sand of this depth, but although we ride the finest machine for the work—the B.S.A.—we cannot emulate these stunts. Even before such a depth is reached we find it impossible to proceed, and have to find an alternative route, generally by pushing through the grass and small shrubs by the side of the road.

The Motor Cycles.

In passing we must pay a tribute to the B.S.A. Of course, we could all improve it, but of all machines for the sheer rough and tumble work out here it stands *sans pareil*. But even here life is not all hardships, and we have our enjoyable times, when life seems worth living, and so we are content to go cheerfully on with our task.

We might state that, in spite of the reports in the papers to the effect that this campaign is over, the same old work still remains. The last remaining forces of the enemy have still to be rounded up in Portuguese East, where, if anything, conditions are worse. Our one fear is that from what little appears in the home papers about German East Africa, people will be inclined to believe that we are engaged on an unnecessary picnic.



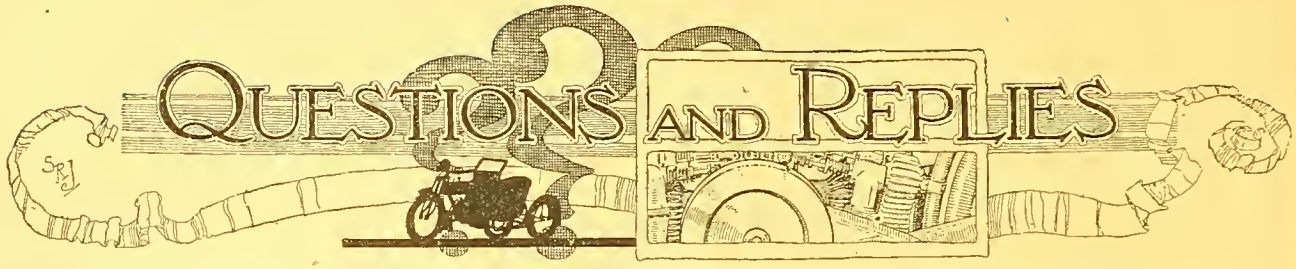
1918 MODELS?

(1) A Tank of American origin, and among the largest type produced. (Photo. International Film Service.) (2) Assisting the Liberty Loan campaign in America. A British Tank demonstrating its power by wrecking the walls of a large building in Boston. (3) A Tank of small dimensions, a design produced in America. (Photo. *Popular Mechanics*.) (4) A huge Tank stated by *Popular Mechanics* to be in use on the French Front. (Photo. Underwood and Underwood.)

PETROL AND PARAFFIN.

MANY people are still apparently under the impression that paraffin is not under the same restrictions as regards its use in a motor vehicle as are petrol and other petrol substitutes. The impression is, however, entirely without justification.

Perhaps there is a slight excuse—it is very slight—for those who think that, if the car is steam driven, paraffin used in the burners is not fuel within the meaning of the act. There is no difference between petrol and paraffin cars as far as the Act is concerned, and if paraffin is used at all it does not matter whether it be burnt in the cylinders or underneath a boiler. Consequently readers should be warned against advertisements of steam cars for sale (other than those using coke furnaces) stating that a petrol licence is not required.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Number Plate Illumination.

Will you please inform me if it is necessary that both front and back number plates of a motor cycle be illuminated when riding at night?—R.E.P.

No; on a motor cycle you can illuminate either the front or back number plate.

Record Speeds.

Please inform me the highest speed ever attained by any motor cycle known. We had a discussion on the subject the other day in the gun room, but no one could answer the question definitely.—V.E.N., R.N.

There is a good deal of difference between speeds claimed and speeds authenticated by official timekeepers. For instance, the fastest officially recorded speed, nearly 93 m.p.h., in this country was done by Sidney George on an eight-valved Indian at Brooklands. In Australia a rider named J. Booth is credited with covering one mile on the Gawler Road in 35s. = nearly 103 m.p.h. He also rode an Indian.

Gear Changing.

I have a Calthorpe-Precision (Junior) fitted with two-speed gear incorporated with the crank case. I should be glad if you would inform me how this type of gear-changing is effected, and whether it has been found satisfactory in use. I find that when changing from low to high gear the engine stops firing by gradually petering out, although once in a half-dozen times it takes the high gear. I see that the engine is "revving" sufficiently. Is it admissible or necessary to lift the exhaust when changing? I can start the engine by running with the machine on top gear all right, so the "high" dogs are apparently correct.—R.B.

The type of gear in question may be said to be fairly satisfactory. The change is effected by means of dog clutches. When changing from low to high, or *vice-versa*, the exhaust lifter should be raised so that the engine is not actually driving the machine when the gear is engaged. The fact that the engine does not fire regularly when you change up is due to a defect in the engine—either it is not giving its full power for some reason or other, or the carburetter needs adjusting. Of course, you must accelerate the engine on the low gear before attempting to change up. Yes; always lift the exhaust when changing, whether up or down.

Joining the Motor Boat Patrol.

I shall shortly be eighteen years of age, and am desirous of entering one of the Motor Boat Patrols in the Royal Navy. Will you please inform me (1) where I must apply to join, and also (2) particulars of the necessary qualifications, etc.?—A.H.

Application should be made to the Auxiliary Yacht Patrol, the Admiralty, Whitehall, London, S.W.1. The qualifications are: For chief motor boatmen, age twenty-two to forty-five, candidates must have served their time as mechanics, and be competent to undertake charge of and do repairs to internal combustion engines. For motor boatmen, age eighteen to forty-five, candidates must have had practical experience in the running of internal combustion engines. Preference is given to men with sea experience.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Running on Coal Gas.

I have recently bought a 3½ h.p. Humber motor cycle engine, which has an inclined single cylinder and accumulator ignition. I want to use it as a stationary engine, and to run it on coal gas from the town supply. Will you please let me know what kind of carburetter is required? Should it be worked mechanically? The engine is fitted with an automatic inlet valve.—B.H.C.

You could get a gas carburetter for the machine from Messrs. Flugel and Co., Ltd., 33a, Green Lanes, London, N 16, or perhaps you could make one. It would consist merely of a chamber in which the gas pipe leads, with a port covered by a slide, through which you could admit air. Once the correct mixture is found you would find that the engine would run satisfactorily. A gas bag made out of a football bladder with an extra inlet, interposed between the main and the carburetter, would probably cause steadier running.

Gear Box Lubrication.

Having just had a Douglas two-speed gear box fitted to my motor bicycle, I should be very much obliged if you would tell me (1) what kind of oil is best for this gear box (2.) How frequently should I oil it?—S.A.S.

(1.) Ordinary engine oil is best. (2.) Squirt in an oil-gunful, say, every 1,500 miles.

Fixing Transfers.

Would you kindly tell me the method of fixing the transfers on to a motor cycle tank?—W.D.

Take a very small quantity of copal varnish, gold size, or any quick-drying varnish, coat the face of the transfer as thinly as possible (a short hog-hair brush is recommended for this), cut all superfluous paper away from the transfer, and let it remain for about one minute, when it should be just "tacky." Then place it face downwards on the object, pressing well down, damping back with a moist rag or leather, slightly at first, and gradually increasing moisture until well soaked. The paper may then be lifted off, leaving the transfer perfect. Wash over the face of the transfer lightly to remove any gum which may be left on the surface, otherwise the transfer will be liable to crack, especially if it is a coloured one. When quite dry give a thin coating of varnish, which will both improve the appearance and prevent the transfer being rubbed off. These instructions also apply to transfer printed upon "Duplex," or stripping paper, except that after varnishing and before placing on the object the two papers should be carefully separated.

RECOMMENDED ROUTES.

BIRMINGHAM TO ALDERSHOT.—T.M.

Birmingham, Henley-in-Arden, Stratford-on-Avon, Long Compton, Enstone, Woodstock, Oxford, Dorchester, Nettlebed, Henley-on-Thames, Twyford, Wokingham, Sandhurst, Frimley, Aldershot. Approximately 110 miles.

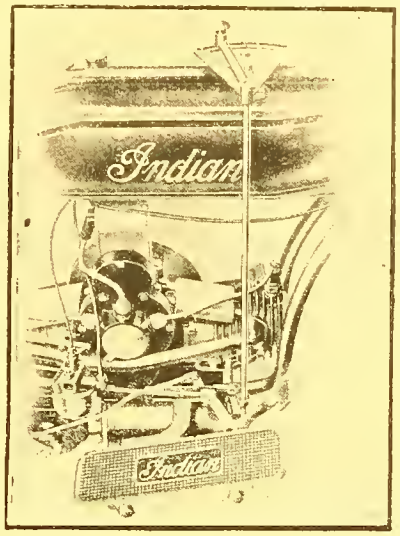
GROVE PARK (LONDON) TO CONGLETON.—H.L.W.

Grove Park, Lewisham High Road, Old Kent Road, New Kent Road, Westminster Bridge Road, Westminster Bridge, Whitehall, Cockspur Street, Regent Street, Portland Place, turn left, Park Road, Wellington Road, into Finchley Road, Barnet, St. Albans, Dunstable, Fenny Stratford, Stony Stratford, Towcester, Daventry, Coventry, Tamworth, Rugeley, Stone, Newcastle-under-Lyme, Congleton.

FEATURE OF THE

1918 **Indian** *LIGHT TWIN.*

THE POWER PLANT AND GEAR CONTROL.



"Indian Motocycle" Hendee Manufacturing Co.

We regret that we are not in a position to supply motorcycles at the present time. But we can send 1918 descriptive list on application.

This applies to Great Britain only.

HENDEE MANUFACTURING CO.,
"Indian House," 366-368, Euston Road, London, N.W.
Telephone: Museum 1643.
Telegrams: "Hendian, Eusroad, London."
AUSTRALIA—109-113, Russell St., Melbourne
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 570, West St., Durban; Indian House, Strand St., Port Elizabeth.

THE Scott TWIN TWO-STROKE

UNDER PRESENT MANUFACTURING CONDITIONS IT IS DIFFICULT TO GIVE THE ATTENTION WE WOULD WISH TO PRIVATE REQUIREMENTS, BUT WE SHALL BE PLEASED TO RENDER ALL POSSIBLE SERVICE TO SCOTT RIDERS AND OTHERS INTERESTED IN OUR PRODUCTS UPON RECEIPT OF THEIR ENQUIRIES.

THE SCOTT ENGINEERING Co., Ltd.,
SHIPLEY, YORKS.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

A.B.C., 1914, 3½h.p., single speed, fine machine; £60.—12, Grove Av., Fishponds, Bristol. [6513

Abingdon.

RIDER TROWARD and Co., 31, High St., Hampstead.—Abingdon-King Dick, 1914, 4h.p., T.T., 22 gns.; 1913, 3½h.p., 2-speed, 21 gns. [6658

ABINGDON, 6-7h.p., 1915 countershaft model, with Millford Empress sidecar, combination in topping order, with Lucas lamps, speedometer, and wind screen; price £75.—Below.

ABINGDON, 1914, 3½h.p., Philipson pulley, both lamps and all accessories; this machine is in splendid condition; price £28.—Bromley Motor Works, Masons Hill, Bromley, Kent. [6330

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [4997

1915 2¾h.p. A.J.S., 3 speeds, complete, lamps, etc.; £41.—Cross, Effingham Sq., Rotherham. [X6106

A.J.S. 1915 6h.p. Combination and accessories; £79/10.—Motor Exchange, Horton St., Halifax. [6542

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

1916 A.J.S. Combination, speedometer, spare wheel, all lamps, etc., complete; £84.—Cross, Jeweller, Rotherham. [X6107

For New Machines

(Solo and Combinations)

AND FOR

Second-hand Machines

OF

AscertainedValue

THE SURE FIRM IS

GODFREY'S

By ascertained valne we mean an intimate knowledge of the state of every working part by actual examination.

The external appearance of a machine you can judge yourself. But it is far from being a reliable guide to valne.

Write for full list of our stock of New and Second-hand Machines.

EXCHANGES. EASY TERMS.

GODFREY'S LTD.

208, Gt. Portland Street, LONDON, W.1.

'PHONE: 7091 MAYFAIR (2 Lines).

Repairs for Spares

DIXIE

or Splitdorf magnetos go to the

MANUFACTURERS'

Representatives. They know what is required. They have the most extensive stock of spares. Address:—

American Supplies Co Ltd

162, Grt. Portland Street,

Phone: MAYFAIR 3258. LONDON. W. 1.

CLEAN ALUMINIUM, BRASS, and GUNMETAL

CASTINGS

For AIRCRAFT, MOTORS, and MOTOR CYCLES.

SAMUEL F. ROGERS

(Metallurgical Chemists & Metalographists),

CALEDONIAN WORKS, PRINCE'S END, TIPTON.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. 1916 6h.p. Combination, Lucas dynamo and lamps, spring seat, spare wheel, very smart; £97/10.—Farrar.

A.J.S. 1915 6h.p. Combination, spare wheel, Lucas lamps, Cowey speedometer, extra smart; £87/10.—Farrar.

A.J.S. 6h.p. Combinations.—We have five in stock. If you wish to buy, sell, or exchange your A.J.S., write us.—Farrar's Motors, Horwood Lane, Halifax. [6124

1914 A.J.S. Combination, 6h.p., lamps, speedometer, horn; £48.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

A.J.S.—Immediate delivery of Military Model, 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

A.J.S., 1915, 4h.p., with 1917 Norton sporting sidecar, ridden 2,300 solo, 1,600 combination, speedometer, tools, spares, excellent condition; what offers?—Attwood, High St., Stone. [6516

A.J.S. Motor Cycles.—Immediate delivery of Military model, complete, detachable wheels, 700×80 tyres; £91/6; no permits required.—P. J. Evans, sole agent for Birmingham and district, 87-91, John Bright St., Birmingham. [6369

A.J.S., 1913-14, 2¾h.p., 2-speed, C.S. clutch, £35; 1914 3-speed and kick-starter, £42/10; 1914 6h.p. combination, £67/10; 6h.p. new military model, £92; E.P. or exchange.—Service Co., 292, High Holborn, London. [6620

A.J.S. 1916 6h.p. Combination, purchased July, complete with Lucas accessories, spare wheel and tyre, hood, screen, Cowey speedometer, new tyres throughout, good condition; bargain, 80 gns.—Cooper, 28, Severn St., Worcester. [X5928

Alldays.

RIDER TROWARD and Co., 31, High St., Hampstead.—Allon, brand new, 2-speed, 1917 model, 39 gns.; 1916, 2-speed, renovated, 29 gns. [6641

LATE 1917 2¾h.p. Alldays Allon, 2-stroke, practically new, not ridden 200 miles, perfect throughout; £58/10.—Fawcett, 43, Grosvenor Terrace, York. [X6020

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

RIDER TROWARD and Co., 31, High St., Hampstead.—Ariel, 1913, 3-speed, renovated; 32 gns. [6641b

1917½ Ariel 3½h.p. Combination, in perfect order, ideal double-purpose mount.—Write, Wilson, Bricket Wood Station, St. Albans. [6505

A.S.L.

A.S.L., 3½h.p. J.A.P., Grade gear, Bosch mag.; £14/10.—Motor Exchange, Horton St., Halifax. [6544

Auto-Wheels.

AUTO Motor, 3½h.p., Bosch mag., good tyres; £7/10.—Collier's Motories, Deal St., Halifax. [6543

Bat.

BAT-J.A.P. Twin, 10h.p., Bosch, 3-speed, good condition; £50.—Brown, 39, Inverness Terrace, Hyde Park, London. [6592

6h.p. Bat Frame and Gloria sidecar, enamel, front tyre, and belt new, other tyres almost new, Bosch shaft drive magneto, P. and M. 2-speed gear, control, and new chains, requires engine only to make an excellent combination; what offers?—Lt. St. John, Grantley Grange, Ripon, Yorks. (D) [X6028

MOTOR CYCLES FOR SALE.

Bat.

RIDER TROWARD and Co., 31, High St., Hampstead.—Bat-Jap, 1914, 5-6h.p., 3-speed, clutch, kick-start, renovated, sporting model; 37 gns. [6645

Blumfield.

1914 Blumfield Combination, 6h.p., 3-speed; bargain, £30.—86, High Rd., Lee, S.E. [6594

Bradbury.

RIDER TROWARD and Co., 31, High St., Hampstead.—Bradbury, 1914, 3-speed, coachbuilt combination, 4h.p., 35 gns.; Bradbury, 1913, single speed, 18 gns. [6642

BRADBURY, 1914, 6h.p., and sidecar, £55; 1912-1913 3½h.p., 3 speeds, with coach sidecar, £32/10; 1913 3½h.p. 3-speed model, £29/10.—Collier's Motories, Deal St., Halifax. [6545

Brough.

BROUGH, 1916, T.T., 2-speed, Binks carburetter, Dunlops, runs on paraffin, spare petrol tank; 50 gns.—Hay, Cookham, Berks. [6501

B.S.A.

B.S.A., 3½h.p., clutch model; £18.—Fryer, 151, Globe Rd., Mile End. [6578

RIDER TROWARD and Co., 31, High St., Hampstead.—B.S.A., 1913, 3½h.p., 2-speed, clutch, pedal start; 25 gns. [6644

B.S.A., 3½h.p., T.T. model, late 1914, in perfect condition; first offer £35.—O.G., 80, Rectory Rd., Stoke Newington, London, N.16. [6529

1916 B.S.A. Combination, 4¼h.p., chain drive, lamps, horn, B.S.A. sidecar, good condition; £70.—Elve and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

B.S.A., 3½h.p., 1914, chain-belt, 3-speed gear box, Canoelet de luxe, screen, Lucas lamps, 6,000 miles only; seen week-ends; best over £60.—52, Wellington Rd., Handsworth, Birmingham. [6500

B.S.A., 3½h.p., and sidecar, clutch, lamps, horn, speedometer, spare belt, tools, spares, Dunlops, nearly new; £21/15.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., opposite Olympia, London. [6528

Calthorpe.

1916 Calthorpe, 2-stroke, lamps and horn; £30.—Parker and Son, St. Ives, Hunts. [6521

CALTHORPE-J.A.P., 1917, 2¾h.p., 2 speeds, new condition, perfect order; £30.—Innes, Jeweller, Consett. [X6062

CALTHORPE Lightweight, 2¼h.p. J.A.P., 2-speed gear; £24.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3523

1917 4h.p. Twin Calthorpe-Jap, countershaft, tyres and condition as new; £45.—Kylemore, Chesterton Rd., Cambridge. [6512

RIDER TROWARD and Co., 31, High St., Hampstead.—Calthorpe-Jap, 1915, 2½h.p., 2-speed, 24 gns.; Calthorpe, 2-stroke, 1915, 2-speed, 23 gns. [6649

1915½ 2¾h.p. Calthorpe-Jap, Enfield 2-speed gear and clutch, exceptional condition; any reasonable offer taken.—Winterbottom, Jeweller, Oldham. [D. [6503

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [6371

CALTHORPE-J.A.P., brand new, Enfield 2-speed, Dunlops; special bargain, £29/15.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., opposite Olympia, London. [6527

CALTHORPE 2-stroke, Enfield 2-speed, brand new; special bargain; Dunlops; £28/15.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., opposite Olympia, London. [6526

CALTHORPE Combination, 1915, 7-9h.p., countershaft drive, 2-speed gear, coachbuilt sidecar, painted grey, with apron, not done 50 miles; offers.—Chisholm Blyth, Northumberland. [X6021

Campion.

RIDER TROWARD and Co., 31, High St., Hampstead.—Campion-Jap, 1915, Jardine 2-speed, clutch, handle-start, countershaft chain-drive, 35 gns.; Campion, 1916, 2-speed, 2-stroke, renovated, 26 gns. [6647

CAMPION, 3½h.p. J.A.P. engine, perfect condition throughout, many spares, powerful head light and generator, waterproof h.b.c. Bosch mag., powerful machine, take sidecar; £19.—Box L6,608, c/o *The Motor Cycle.* [6569

Chater-Lea.

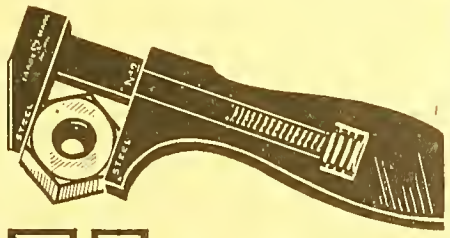
1915 7-9h.p. Chater-Lea Combination, in nice order; £55.—86, High Rd., Lee. [6595

CHATER-LEA Low Frame, spring forks, tanks, wheels, tyres, etc., etc.; £4/17/6.—77, Acre Lane, S.W.2. [6581

CHATER-LEA, 2-stroke, 2-speed; first cash secures, £16/10.—Clapham (Motors), King George St., Greenwich. [X6086b

Clyno.

RIDER TROWARD and Co., 31, High St., Hampstead.—Clyno, 1916, 2-speed, clutch, 2-stroke renovated; 29 gns. [6648



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Godbolds.

MOTOR CYCLES FOR SALE.

Connaught.

1914 Connaught, 2¾h.p., 2-speed; £20.—Ross, 86, High Rd., Lee. [6596

Coventry Eagle.

RIDER TROWARD and Co., 31, High St., Hampstead.—Coventry Eagle, 1916, 2-speed Villiers; 28 gns.; renovated. [6646

Diamond.

DIAMOND, 2¾h.p., 2-speed, 2-stroke, extra good; £25/10.—Motor Exchange, Horton St., Halifax [6546

DIAMOND, 1916 sporting model, 2¾h.p., overhead valves, 2-speed gear, chain drive, fully equipped, lamps, etc.; cost £60, accept £40; fast and perfect, not used since 1916; owner unable to ride again, invalided from army.—A. Braid, Gwynfa, Abergele. [X5806

Douglas.

1914 Douglas, 2 speeds, complete, lamps, etc.; £27.—Cross, Agent, Rotherham. [X6108

DOUGLAS, 2¾h.p., 1912, not used since 1914; 15 gns.—77, Acre Lane, S.W.2. [6684

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749

1912 2¾h.p. Douglas, 2-speed; bargain to clear, £20.—Clapham, 119, King George St., Greenwich. [X6086

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS, 1915, 2 speeds, Model U., all accessories, electric lighting; £38.—Pearn, Kelsie, Birchfields Rd., Manchester. [X6049

DOUGLAS, 1912, 2¾h.p., 1914 frame, 2 speeds, F.E., kick start, all accessories, fast machine.—Millington, Rowley Park, Stafford. [X6015

1914 Douglas, 2¾h.p., in good condition, for sale; owner joining up; what offers?—Particulars from 34, Great Elms Rd., Bromley, Kent. [X5933

DOUGLAS Motor Cycles.—We can supply by return 1918 models on receipt of permit.—Eli Clark, the Douglas agent, 196, Cheltenham Rd., Bristol. [0923

DOUGLAS, 2¾h.p., 2 speeds, kick starter, 2 brand new tyres, just re-enamelled and renickelled, condition like new; by appointment; no dealers.—Write, W., 50, Guilford Av., Surbiton. [6616

RIDER TROWARD and Co., 31, High St., Hampstead.—Douglas, 1914, 2¾h.p., 2-speed, renovated, 36 gns.; ditto, standard, 33 gns.; 1913 Douglas, 2-speed 28 gns.; 1911 Douglas, single speed, 13 gns. [6650

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS.—New 1918 models supplied to doctors, farmers, etc., against Ministry of Munitions permit. 1913 2-speed Douglas, £29/10; 1914 2-speed model, £34/10.—Motor Exchange, Horton St., Halifax. [6547

DOUGLAS, 1911, not used since 1914, mechanical condition really good, tyres practically new, also belt, Lucas head light and generator, and tail lamp; first cheque £12 secures.—Douglas, 3, Handel Rd., Southampton. [6520

1912-13 Douglas, 2¾h.p., 2-speed countershaft gear, Bosch mag., new tyres, lamp, horn, stand, good running order; must sell, owner joining up; first cash £22/10 secures, bargain; stamp, reply.—123, Seymour Av., Tottenham, N.17. [6518

1918 2¾h.p. Douglas Motor Bicycles, brand new, for immediate delivery, models W clutch, U touring, V T.T., against Priority Permit only. Write for particulars how and where to obtain one.—Douglas Specialists, Robinson's Garage, Green St., Cambridge. [6426

Enfield.

ENFIELD 1915 6h.p. Combination, £75; 1916 ditto, £84; E.P. or exchange.—Service Co., 292, High Holborn, London. [6626

ENFIELD 3h.p. Twin, 66 gns.; touring and T.T. models in stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3522

1916 Enfield Combination, 8h.p., screen, lamps, horn; £75.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

ENFIELD, 1915, 6h.p., 2-speed coach combination, in fine order, £72/10; 1916 model, £82/10.—Collier's Motories, Deal St., Halifax. [6548

ENFIELD 1916, 6h.p. Coach Combination, 3 lamps, horn, 700×80 tyres, spare tank, perfect running order; £70.—Reeve, 49, Chapel St., Rugby. [X6090

RIDER TROWARD and Co., 31, High St., Hampstead.—Enfield, 1916, 3h.p., 2-speed, clutch, kick start, absolutely as new, 39 gns.; ditto, 1915, excellent condition, 33 gns. [6651

VERY Fast 1916 3h.p. T.T. Enfield, 2-speed, extra large competition tank, long exhaust pipes, wonderful climber, very sporty looking bus, excellent condition, petrol; £45, or consider exchange; also 1917 canoelet racing sidecar, coachbuilt, as new, £7.—Brown, 16, Broad St., Ross-on-Wye. [X6085

Excelsior.

RIDER TROWARD and Co., 31, High St., Hampstead.—British Excelsior, chain-driven, 2-speed, clutch, 2-stroke, 1916, renovated; 28 gns. [6643

F.N.

RIDER TROWARD and Co., 31, High St., Hampstead.—F.N., 1913, 5-6h.p., 4-cyl., 2-speed; 27 gns. [6652

7-9h.p. 4-cyl. 1914-15 Model F.N., with coachbuilt sidecar, 3-speed end clutch, drives like a car, all in splendid condition, together with accessories; £67/10.—Apply, G. Carey, 414, Brockley Rd., London, S.E. [6514

Grandex.

RIDER TROWARD and Co., 31, High St., Hampstead.—Grandex-Precision, 1914, 3½h.p., 2-speed, clutch; 23 gns. [6653

Harley-Davidson.

HARLEY-DAVIDSON 1915 7-9h.p. Combination, electric; £65; E.P. or exchange.—Service Co., 292, High Holborn, London. [6627

RIDER TROWARD and Co., 31, High St., Hampstead.—Harley-Davidson, 1915, 7-9h.p., 3-speed, mag. combination; 62 gns. [6654

1915 Electrical Model Harley-Davidson Combination, in excellent condition; £62.—Brooklands, Birch Grove, Acton. 'Phone: 992 Chiswick. [X6067

HARLEY-DAVIDSON, 1916, with Harley sidecar and accessories, £82/10; 1915 combination, £69/15.—Motor Exchange, Horton St., Halifax. [6550

HARLEY-DAVIDSON, 1916, electrical model, all tyres practically new, in sound condition; £97/10 cash, or plus 2% for deferred payment.—Wm. Whiteley, Ltd., Queen's Rd., W. [6531

HARLEY-DAVIDSON 1915 Combination, electric model, excellent condition, enamelling and plating as new; lowest, £65, or exchange lower power combination, nothing considered less than 1915 and a countershaft model; appointment.—Coe, 206, Links Rd., Tooting Junction, London, S.W.17. [6580

Hazlewood.

2¼h.p. Hazlewood-Jap, 3-speed, starter, etc., snip, £18/10, offers, exchanges.—Olapham (Motors), King George St., Greenwich. [X6086a

HAZLEWOOD Combination, 1914, 5h.p., 3-speed, kick starter, good condition; £38, or exchange.—A. Slade, 64, Hawks Rd., Norbiton, Surrey. [6572

Henderson.

HENDERSON, 1914, 4-cyl., perfect running order; cash £65, or £45 cash and useful exchange; seen evenings.—Howard Wilson, 33, Acre Lane, Brixton, S.W. [6332

MOTOR CYCLES FOR SALE.

Humber.

HUMBER, 3½h.p., vertical engine, mag., spring forks; £13/10.—Motor Exchange, Horton St., Halifax. [6549

1913 3½h.p. Humber, Roc 2-speed, handle starting, beautiful condition throughout; any trial; £20, or nearest.—Hill, Old Somerby, near Grantham, Lincs. [X6077

RIDER TROWARD and Co., 31, High St., Hampstead.—Humber, new 1918 model, 3½h.p. flat twin, 3-speed, khaki finish, £75; Humber, 1914, 2h.p. lightweight, 18 gns. [6655

Indian.

1915 5h.p. Red Indian, T.T model, 3-speed, clutch; £38.—Railway Garage, Staines. [5771

INDIAN, 5h.p., nice running order, smart; £30, or exchange A.J.S., or good lightweight with cash.—Brown, Rangemore, Burton-on-Trent. [X6075

INDIAN, 7-9h.p., free engine, twin, £23/10; 1914 7-9h.p., 2 speeds, spring frame, Millford sidecar, £49/10.—Collier's Motories, Deal St., Halifax. [6551

INDIAN, 5-6h.p., 3-speed, clutch model, with Millford sidecar, combination purchased brand new Easter, 1917, little used on account of petrol restrictions; £75.—Carter, 4, Park Farm Rd., Kingston-on-Thames [6612

INDIAN (red), genuine 1915, 5h.p. twin, mag., 3 speeds, clutch, kick, speedometer, mechanical horn, beauty; sacrifice 45 gns., worth 55 gns.; exchange lower power.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [6585

RIDER TROWARD and Co., 31, High St., Hampstead.—Indian, 1916, T.T., 7-9h.p., clutch, as new, with brand new 1918 sporting 15 gn. Phœnix sidecar, 57 gns.; solo, 46 gns; Indian, late 1915, 7-9h.p. T.T., clutch, 39 gns.; ditto, early 1915, 36 gns.; ditto, 1914, 29 gns. Indian, 1914, 7-9h.p., 2-speed, spring frame, 35 gns. [6656

Ixion.

1914 Ixion, 2¾h.p., 2-stroke; £15.—86, High Rd., Lee. [6598

James.

JAMES, brand new W.D. model, solo or combination, very fine turnout; can be had on our deferred payment system.—Wm. Whiteley, Ltd., Queen's Rd., W. [6534

JAMES 1916 4½h.p. Combination, Lucas dynamo lighting, £75/10; ditto, acetylene, £64; E.P. or exchange.—Service Co., 292, High Holborn, London. [6622

RIDER TROWARD and Co., 31, High St., Hampstead.—James, 1914, 4½h.p., 3-speed, clutch, renovated, 36 gns.; James, 1914, 4¼h.p., single speed, renovated, 27 gns. [6657

JAMES 3½h.p. Twin, late 1915, excellent condition, tyres practically new, very little used, kick start, 3-speed; £40, or near offer.—Lt. St. John, Grantley Grange, Ripon, Yorks. (D) [X6029

J.A.P.

1914 5-6h.p. J.A.P. Combination, lamps and horn, 3-speed, kick starter, good condition; £38, or offers.—Parker and Son, St. Ives, Hunts. [6523

Lea-Francis.

LEA-FRANCIS 1914 Model Coachbuilt Combination, twin J.A.P., Bosch, 2 speeds (countershaft), clutch, kick, lamps; 39 gns.; exchanges, also easy terms.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [6586

Levis.

LEVIS, latest type, 2 speeds, 2-stroke model; immediate delivery for work of National importance; £47/10.—Maudes', 100, Gt. Portland St., London, W.1. [6110

LEVIS, 2½h.p. Model E., Enfield 2-speed, chain drive, brand new, in stock; special bargain, £39/15.—Wilkins, Simpson and Co., 11, Hammersmith Rd., opposite Olympia, London. [6525

Lincoln-Elk.

RIDER TROWARD and Co., 31, High St., Hampstead.—Lincoln-Elk, 1913, 3½h.p., variable gear; 19 gns. [6659

LINCOLN-ELK, 1914, 6h.p., countershaft gear, underslung coach sidecar; £45.—Motor Exchange, Horton St., Halifax. [6552

Matchless.

1914 8h.p. Matchless-Jap Combination, 2-speed, twin belt drive, P. and H. head lamp; 38 gns.—243, Stockport Rd., Ashton-under-Lyne. [X6019

MATCHLESS.—Delivery from actual stock of M.A.G. and J.A.P. engined models; exchanges if desired.—Maudes', 100, Gt. Portland St., London, W.1. [5576

MATCHLESS New 8h.p. War Model Combination, £125; second-hand combination, £70; E.P. or exchange.—Service Co., 292, High Holborn, London. [6628

RIDER TROWARD and Co., 31, High St., Hampstead.—Matchless, 1913, 6h.p., 2-speed, coachbuilt sidecar, 35 gns; Matchless, 1914, 8h.p., 6-speed model, renovated, 39 gns. [6661

Motosacoche.

1914, 1916 Motosacoche, 2¾h.p., 2-speed; £25 and £35.—Ross, 86, High Rd., Lee, S.E. [6599

RIDER TROWARD and Co., 31, High St., Hampstead.—Motosacoche, 1915, 3½h.p., 2-speed, clutch, kick start, as new; 37 gns. [6660

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1918 NEW HUDSON

Combination, 3-speed, kick-starter, clutch.

Price **£86/12/6**

Also the following New Machines, latest models, in stock, all of which can be supplied without permits.

NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed	44 gns.
LEVIS POPULAR, 2-stroke	£32 0
LEVIS, 2½ h.p., 2-speed	£47 10
LEVIS, 2½ h.p., 2-stroke	35 gns.
ROVER, W.O., 5-6 h.p. J.A.P., and Sidecar	£124 5
ROVER, W.O., 5-6 h.p. J.A.P., 3-speed	£97 10
ROVER, 3-speed	£80 0
ROVER, T.T., Philipson	£67 10
ROVER, 3-speed, not done 2,000 miles	50 gns.
1917 LEVIS POPULAR, two-stroke, equal to new	25 gns.

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Biggest Light Car and Motor Cycle Dealer in the South.
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MOTOR CYCLES FOR SALE.

Motosacoche.

2½h.p. Motosacoche, with chain speed gear and free engine, horn, large lamp, large saddle, and distance recorder, has been well kept, and used only by medical man.—Apply, Fieldgate, Kenilworth. [X6071

New Hudson.

NEW Hudson, 3½h.p., 3-speed, and new coach sidecar; £32/10.—Motor Exchange, Horton St., Halifax. [6554

3½h.p. 3-speed New Hudson, waterproof Bosch. B. and B., new tyres and belt, just been renovated, tank enamelled Triumph colours, fine running order, appearance better than when new; bargain, £30. 1a, Richardson Rd., Eccles, Manchester. [X6041

NEW HUDSON 1914, 6h.p., 3-speed, clutch, kick-starter, drive from 2-seater sociable sidecar, Bosch, Binks, Jones trip, hood, screen, exhaust foot warmer, beautiful turnout; £65.—129, Grove Green Rd., Leytonstone, E.11. [6488

RIDER TROWARD and Co., 31, High St., Hampstead.—New Hudson, 1915, 6h.p., 3-speed countershaft drive coachbuilt combination, as new, 52 gns.; ditto, 1914, 45 gns.; New Hudson, 1916, 2-speed, 2-stroke, as new, 28 gns.; New Hudson, 1916, single speed, 2-stroke, 21 gns. [6663

New Imperial.

CROW Bros., Guildford.—New Imperial, all models, new and second-hand, in stock. [5371

1916 New Imperial-Jap, 2½h.p., 2-speed, free engine, new condition throughout; £25.—R. Croydon-Fowler, Cadleigh, Ivybridge. [X6076

NEW Imperial-Jap, 8h.p., 3-speed War Model combination; 109 gns.; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3521

RIDER TROWARD and Co., 31, High St., Hampstead.—New Imperial, 1916, 2-speed, renovated, 29 gns.; ditto, 1915, 25 gns.; 1915 standard, 23 gns. [6662

NEW IMPERIAL, 2-speed, clutch, and kick-starter, £54/5/6; 1916 2¾h.p., 2-speed, £30/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [6621

NEW Imperial Motor Cycles, 2 speeds, clutch and kick starter, and lady's models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [6372

Norton.

NORTON Big Four, all chain drive; £82/10; in stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3524

MOTOR CYCLES FOR SALE.

Norton.

1916 4h.p. Norton Combination, lovely order throughout; £65.—H. Wareing, 182, Portland St., Southport. [X6072

NORTON, 1917, 3½h.p., T.T. model, only done 900 miles, speedometer, mechanical horn, Lucas lamps, exhaust whistle, in sound condition; £55 cash, or plus 2½% for deferred payments.—Wm. Whiteley, Ltd., Queen's Rd., W. [6532

N.S.U.

RIDER TROWARD and Co., 31, High St., Hampstead.—N.S.U., 1913, 3h.p., 2-speed, clutch, pedal start; 19 gns. [6665

N.S.U., 3h.p., 2-speed, fine condition, £11/10; 3½h.p., 2 speeds, new coach sidecar, £22/10.—Collier's Motories, Deal St., Halifax. [6553

N.U.T.

RIDER TROWARD and Co., 31, High St., Hampstead.—Nut-Jar, 1915, 3½h.p. twin, o.h.v.; 37 gns. [6664

O.K.

1914 O.K., 2¼h.p., 2-speed; £15.—86, High Rd., Lee, S.E. [6600

RIDER TROWARD and Co., 31, High St., Hampstead.—O.K.-J.A.P., 1916, 2-speed, clutch, 26 gns., renovated; O.K.-Precision, 1914, 4h.p., T.T., 21 gns. [6666

Omega.

1914 Omega, 2-stroke, 2¾h.p., 2-speed; £20.—86, High Rd., Lee, S.E. [6601

P. and M.

1914 and 1913 P. and M. C.B. Combinations, 3½ h.p.; £43 and £25.—Ross, 86, High Rd., Lee. [6602

Premier.

PREMIER, 3½h.p., 3-speed Armstrong, in good condition; £18.—Haybittle, 5, Claremont Rd., Staines, Middlesex. [6577

PREMIER, 1916, 3½h.p., 3-speed countershaft, military colour, lamp, spares, not ridden since restrictions; £43.—E. Howells, Garn Rd., Blaenavon, Mon. [6510

1913 3½h.p. Premier Coachbuilt Combination, Armstrong 3-speed, Mark VI., new heavy Dunlops, lamps, horn, mat, hardly used; £45.—182, Clive Rd., Dulwich, S.E.21. [6576

RIDER TROWARD and Co., 31, High St., Hampstead.—Premier, 1915, 3½h.p., 3-speed coachbuilt combination, 45 gns.; Premier, 1914, 3½h.p., 3-speed Canoelet, 35 gns.; Premier, 1913, 3½h.p., 3-speed combination, 29 gns.; Premier, 1914, 3½h.p., 2-speed countershaft, 28 gns.; Premier, 1914, 2½h.p., clutch model, fine order, 24 gns.; Premier, 1912, 3½h.p., Grado gear, 19 gns. [6667

Quadrant.

1914 Quadrant, 3½h.p., 3-speed; £27.—Ross, 86, High Rd., Lee. [6603

RIDER TROWARD and Co., 31, High St., Hampstead.—Quadrant 1913, 4½h.p., 3-speed, renovated; 32 gns. [6673

Radco.

RADCO, 1915, 2-speed, 2-stroke; £22/10.—Motor Exchange, Horton St., Halifax. [6555

RIDER TROWARD and Co., 31, High St., Hampstead.—1915 Radco 2-stroke, good condition; 17 gns. [6669

Rex.

RIDER TROWARD and Co., 31, High St., Hampstead.—1915 Rex, 8h.p., T.T., clutch, 29 gns.; 1913 Rex 6h.p. combination, 27 gns. [6670

REX 3½h.p. Tonfist, £12/10; 2¾h.p., 3-speed, £22/10; 2-speed twin, £18/10; Rex 6h.p. twin, m.o.v., £14/10; 1914 2-speed, 6h.p., and coach sidecar, £46/10.—Collier's Motories, Deal St., Halifax. [6559

Rex-Jap.

RIDER TROWARD and Co., 31, High St., Hampstead.—1914 Rex-Jap, 8h.p., T.T., fine condition; 29 gns. [6671

1914 6h.p. Rex-Jap Combination, enclosed chain drive, countershaft 3-speed, electric lights; bargain at £45.—F. Lester, Leckhamstead, Buckingham. [X5929

Roach.

ROACH, 3½h.p., Kerry 2 speeds, free engine, and sidecar; £18/10.—Motor Exchange, Horton St., Halifax. [6557

Rover.

1914 Rover, 3½h.p., 3-speed; bargain, £34.—86, High Rd., Lee. [6606

1914 3½h.p. 3-speed Rover, lamps, horn; £38.—Parker and Son, St. Ives, Hunts. [6522

ROVER, 1914, 3½h.p., T.T. model, fine order; £29/10.—Collier's Motories, Deal St., Halifax. [6556

RIDER TROWARD and Co., 31, High St., Hampstead.—Rover, 1913, 3½h.p., clutch model; 21 gns. [6672

ROVER Motor Cycles, 3½h.p. and 5-6h.p. models, in stock for immediate delivery, both solo and sidecar outfits; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [6370

JULY 18TH, 1918.

THE MOTOR CYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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The Future of Benzole.

IN face of all the facts given in our last issue the apathy of the motoring community as a whole is more than simply astounding. Men who have been connected with the industry for years, and who might be expected to bring a little intelligence and commonsense to bear on their outlook, persist in believing that very shortly after the declaration of peace petrol and benzole will overflow the land, and will be available for use in unlimited quantities at prices perhaps even less than those obtaining before the war. The belief is very pleasant, but it is one that is hardly likely to be realised. *Demands* on petrol after the war may not be as great as they are now, but they will be considerably greater than any known before the war. The supply may be slightly greater, but the increase in the supply will in all probability be very much less than that in the demand.

Benzole is the answer that will be given by nine out of ten; but nine out of ten people seem ignorant of one or two fundamental facts regarding the home production of benzole. Before the war benzole was an inconsiderable factor in the determination of petrol prices. There was so little benzole available that the petrol companies were able to settle their prices and rule the market just as if benzole did not exist. The benzole may have been produced in quantities, but, as we have pointed out in previous articles, far more English produced benzole went abroad than was used at home. Now, while the plants for the production of benzole have very much increased both in number and efficiency, so that perhaps benzole might be quite a noteworthy factor in the post-war fuel question if the demands were not greater than in pre-war days, it is practically certain that after the war the position of benzole on the fuel market will be very similar to that which it occupied before the war, because, while it will be there in greater quantities, there will be a greater demand, and its relative importance will remain more or less constant. Moreover, there is another aspect of the case.

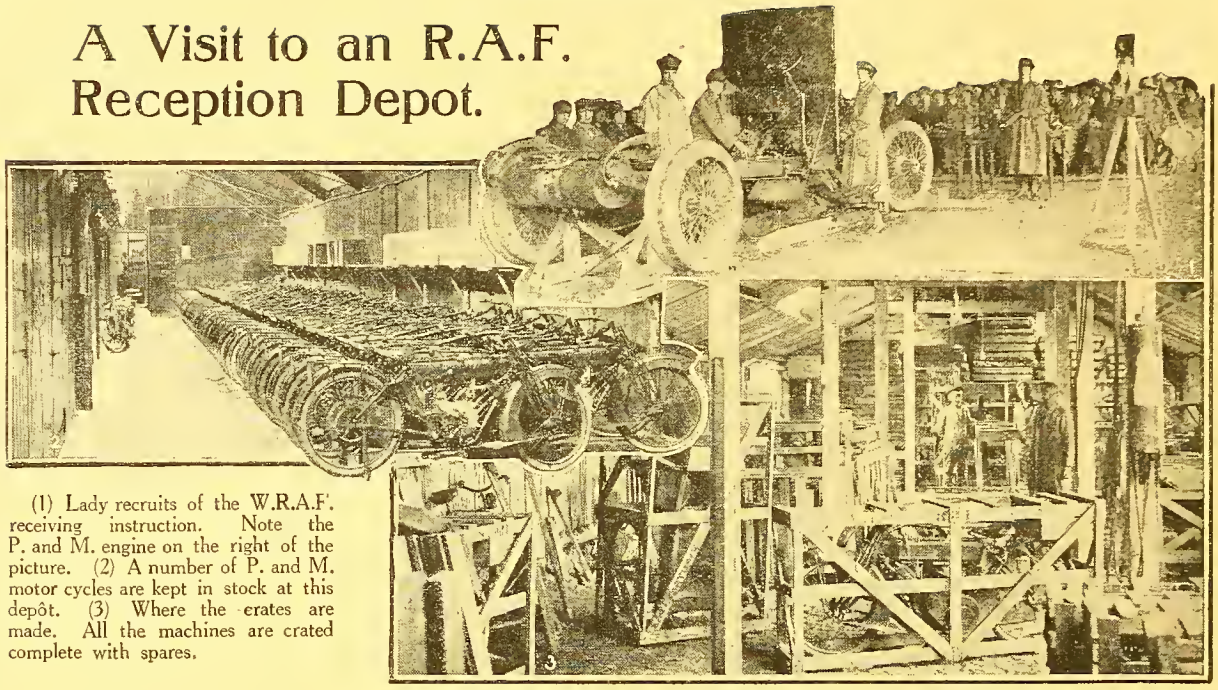
Many gas companies have already stated that they do not intend to go on with their deliberate production of benzole (they are bound to produce a certain amount as a by-product, but this amount is comparatively very small) unless they are assured of a market. Consequently, we feel that it is up to us, as a journal existing for the benefit of motoring, to all our contemporaries having the same professed justification for their existence and to all those wealthy organisations existing for the good of motorists, to take what steps we can to ensure that a market shall be available for benzole if it is produced in large quantities after the declaration of peace.

We beg to bring it forward for the consideration of all the important organisations that they should *now (it is no good waiting until it is too late)* circularise their members, securing from them an undertaking to take a certain amount of benzole after the war for a certain number of years, say, two or three, at a price not exceeding, say, two shillings per gallon. If sufficient pledges could be obtained, benzole producers would be assured of a market. This being so, they would develop "quantity" production, and the inevitable result should be the lowering of the price of benzole, so that, although the customers had guaranteed to buy the fuel at, say, two shillings per gallon, they would, as a matter of fact, actually be called upon to pay much less than this. The ensuring of the market is the main thing. With it, of course, the signatories of the pledges will incidentally serve to reduce the consumption of petrol.

We must, above all things, guard against the capturing of the main interests in the benzole production by the present oil ring. This is a measure in which, perhaps, only Government action will be efficient; but the whole question is a national one, and it should be the business of the Government to be alert in recognising it as such, and to deal with it accordingly.

An index to the advertisements in this issue will be found on the page facing the back cover

A Visit to an R.A.F. Reception Depot.



(1) Lady recruits of the W.R.A.F. receiving instruction. Note the P. and M. engine on the right of the picture. (2) A number of P. and M. motor cycles are kept in stock at this depôt. (3) Where the crates are made. All the machines are crated complete with spares.

IT was lately our good fortune to visit one of the largest R.A.F., M.T., depots in the kingdom in company with an officer in the M.T., R.A.F., who is well-known in both automobile and motor cycle circles. So far as motor cycles are concerned, at the present moment this depot receives the P. and M.'s, which are now exclusively used by the Royal Air Force, equips them, and despatches them to the various units at home and abroad.

One of our illustrations shows a large number of P. and M.'s ready to be despatched to one of the Eastern fronts.

A large number of recruits (both men and women) are received each week for instruction in motor car and motor cycle driving and mechanism, and a little later on are turned out as finished drivers. The work of instruction is carried out in the most efficient manner, the course taking about six weeks. Lessons are given daily in driving over varied routes, which are policed by men and women instructors on motor cycles, who go the reverse way of the course to the recruits so that they can check the passing of every vehicle.

Even the crates are made on the premises, and the machines are carefully packed in these complete with their spares and the necessary equipment.

Before the transport section of the R.A.F. came under the control of its present organiser several makes of motor cycles were employed, but now all the machines are exclusively P. and M.'s, and these have done useful service for their country with the R.F.C. and R.A.F. The fact that only one make is used simplifies organisation to an enormous extent, especially as regards spare parts. In the same way, so far as possible only three makes of cars are employed: Fords for light work, Crossleys for passenger cars and light tenders, and three-ton Leyland lorries for the transport of heavy goods.

The Cost of Post-war Machines.

Refinements which have become Necessities that will Influence the Price List.

IT appears to be generally accepted that the cost of post-war machines will be higher than the pre-war product, if only for the reason that manufacturers will embody additional features in their new models. Before the war buyers were expressing surprise that prices had been on the up-grade for several years. On investigation, however, facts are revealed which explain why a machine, which in 1910 was, say, £47, should be £60 in 1914, and why the post-war model may be £70, even without consideration of the probable increase in cost of materials and labour.

The £47 machine of 1910 was a single gear model, consisting of little more than an engine and frame. Then came clutch models, two-speed gears, three-speed gears, kick-starters, chain drive, chain cases, etc. For their post-war machines motor cyclists will expect detachable wheels and spring frames, and all these things cost money. Many riders are clamouring for dynamo lighting, and this will be a standard feature on many machines. There is a distinct indication that several machines will be placed on the market after the war fully equipped with a small and efficient combined dynamo and magneto, as we have already suggested, and if this comes about it would be still more difficult and ridiculous to compare prices of machines so different in important details. And then there is the question of the machine equipped with ordinary fully-fledged dynamo lighting outfit and electric horn, etc.

About Cocktails.

IF any bright lad offers to treat me to a new brand of cocktail, I generally "put it down." Afterwards I invariably revert to the familiar corpse revivers. Sheer novelty has an invincible attraction for most of us, and we cannot resist the temptation to experiment. If the water-cooled four-cylinder advocated by "C.R.E." comes along (and I have seen two of them on the road this year), I shall approach it with the same beaming thirstiness as a new cocktail. I shall, so to speak, sip it, roll it round my tongue, gargle it in my throat, analyse my after impressions—and finally return to air-cooling. As long ago as 1913 I coaxed a high geared, high compression, 500 c.c. air-cooled engine over Applecross—probably the most gruelling test of cooling on a British road; if air-cooling is good enough, why should I revert to something more expensive, weightier, and less reliable? The real question of the immediate future is not whether water-cooling will oust air-cooling on motor cycles, but whether water-cooling can survive on small and medium cars.

A Reservation.

I DARE not say that I will never own another water-cooled motor cycle. For example, I have a weakness for the Scott; and I will take no self-denying ordinance which bars it from my stable if the designer fails to keep it cool without tanks. More than this, there are limits to air-cooling which are as yet largely unrealised. The conking qualities of petrol have so far set low limits to compression ratios and to other factors of design which affect the working temperature of an engine. We may yet evolve composite or synthetic fuels which only conk at colossal temperatures and pressures—benzole is a step in that direction. Some genius may ultimately invent, let us say, a 5 h.p. unit no larger than a 1 lb. jam pot. Such a tabloid engine might have to be water-cooled. Or, again, if it were ever my hard fate to steer a passenger outfit through a six days Alpine trial, and British manufacturers failed to incorporate the latest aero tips in respect of air-cooling, I would temporarily revert to water. But for use on home roads a water jacket radiator and tank strike me as senseless encumbrances—at any rate on four-stroke engines.

A Little Piece of Swank.

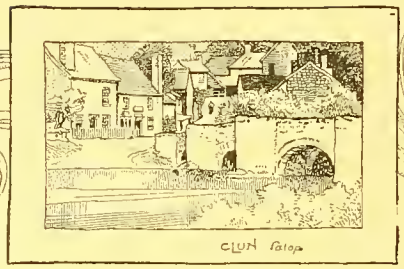
AT the risk of getting lynched by a mob of justly exasperated readers, I will modestly remark that I am one of perhaps a hundred motor cyclists—hardly more—who know what genuine riding comfort is. To taste its bliss you must possess four essentials, viz. (1) a really efficient spring fork, (2) a really efficient rear springing, (3) a practically vibrationless engine, and (4) a first-rate saddle. Moreover, these four essentials must be combined in a single machine. I am one of the very few lucky riders who own such a specification, and, frankly, it puts one out of conceit with the ordinary stuff, and transforms the whole atmosphere of a ride. We are none of us so "nesh" as we used to be, to quote a homely north-country expression: but neither the war nor anything else can make us put up with unnecessary discomfort; and comfort is a point of vital selling importance to which few British manufacturers have given adequate attention. The average first-class Yank usually has the average first-class Britisher "whacked to the wide" in this respect.

Aero Plugs in Motor Cycle Engines.

SOME weeks ago I received a pitiful wail from an old friend who rides a two-stroke. His engine, like many of its kidney, tends to wax sultry when the work in hand is hard. From its youth up its ignition has depended upon a faithful old 1913 single-point plug, and by dint of repeated cleansings that plug lasted him five years. A month or two back it refused to spark, and then his troubles began. Eventually, after many tribulations, he tried another make of plug on which hill-climbing was just possible, provided he rode very cannily along the level pieces between the hills. So I put him in the way of getting an aero engine plug, and to judge by the delirious screed now to hand it has enabled his engine to do a ten hours' non-stop on full throttle. This suggests that some of our post-war plugs may prove rather charming, but they may cost more than the ordinary type. To save postage, let me remark that I cannot procure further aero plugs for other tortured readers at any price.

Home-made Engines.

I BELIEVE one aftermath of the war will be a vast increase in the number of amateur constructors, even if the wave ebbs after the present generation is gathered to its fathers. For example, I know quite a lot of men—many of them in humble positions—who intend to turn out miniature scale duplicates of famous aero engines, and fit them to cycles, sidecars, or cycle cars. I daresay some of these ambitious plans will never come to fruition, but they are sincere enough at the moment. If the necessary h.p. is distributed over seven or nine cylinders, the turning work is within the compass of quite a small Drummond lathe, and some of these enthusiasts are already preparing scale drawings, and doubtless infringing valuable patents. Whether these tiny multi-cylinder engines will quite fulfil their constructors' dreams is another matter: the workmanship will certainly have to be of the best. But I quite expect within two years of peace to encounter weird little cigar-shaped monocars, with tiny pseudo-Clerget engines, spinning merrily round under aeroplane cowls, and other freaks of the sort, too complex to repay commercial manufacture



SPRING FRAMES.

RECENT DESIGNS.

A Brief Description of Eight Springing Devices patented during the last Few Months.

SINCE the last Olympia Show there have been over 116 spring frame designs reviewed in the pages of *The Motor Cycle*, from which we may well assume that our campaign in favour of rear springing has borne fruit. Perhaps it would be more correct to use the simile of the blossom and the fruit, as the greater number of the designs referred to is but the former. However, if the

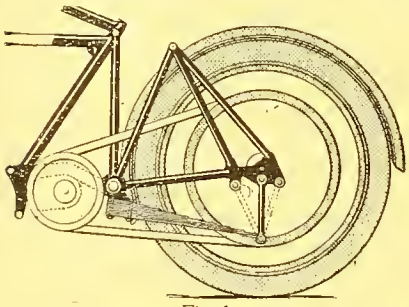


Fig. 1.

"fruit" be in proportion to the "blossom" many post-war machines will have spring frames.

In the meantime the rider's interest in rear springing is keener than ever, while those who are still permitted to use their machines constantly write to us that in their opinion the springing problem is subservient to no other.

Laminated and Coil Springs.

Among the many firms who are displaying interest in the springing problem, we may mention the makers of the Royal Enfield, Matchless, Douglas, Royal Ruby, Raleigh, Rex, Veloce, A.B.C., and Zenith.

The Hayward design, fig. 1, employs laminated leaf springs carried on saddles at the rear of the gear box position, which are attached to a pivoted wheel frame by means of links that may be used in three alternative positions. The illustrations render a lengthy description unnecessary.

The McLeod patent, fig. 2, is of a different nature, and embodies coil springs controlling the rotary movement of discs on which the hub of the wheel is mounted eccentrically—that is to say, the wheel axle is arranged to the rear of the centre of the side discs so that the axis about which the wheel rotates is eccentric to the axis about which the discs oscillate. By adjusting the axle towards or away from the axis of the discs the eccentricity can be varied. The discs are provided with arms which are connected to spring-loaded plungers, and these provide the springing element.

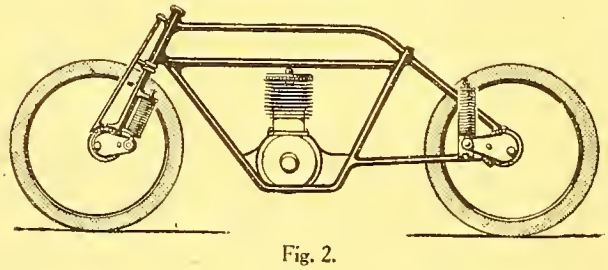


Fig. 2.

Systems—Simple and Complicated.

The Taylor device, fig. 3, comprises an approximately triangular rear wheel frame hinged to the main frame near its inner lower end and arranged to slide between

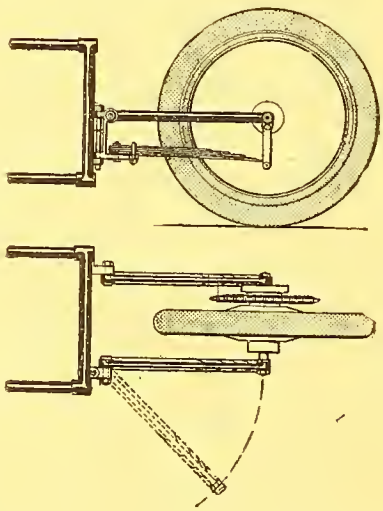


Fig. 4.

guides for lateral support. The springing element is provided by coil springs, as illustrated, while one of the features of the design is the provision made for carrying the brake pedals on the wheel frame so that any relative movement will not affect the adjustment of the brake.

The Forknall design, fig. 4, is intended primarily for three-wheel runabouts, and is fully explained by the illustrations. It will be seen that the springs and stays (or radius rods) are made to swing out to render the wheel accessible for removal.

Fig. 5 shows the Enfield patent, which, it will be noted, is extremely simple, and contains a shock-absorbing or rebound spring within the carrier of the main spring.

Figs. 6 and 6a illustrate the Getty patent spring frame and detachable wheel. The inventor has introduced features which will not make a strong appeal to most motor cycle engineers. It will be observed that in order to obtain a quickly detachable wheel the final drive

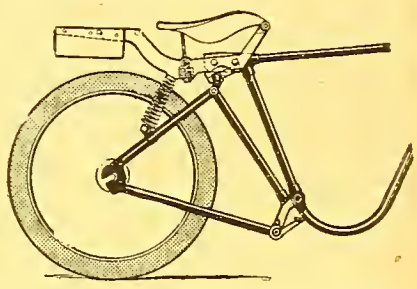


Fig. 3.

is taken through three spur gear wheels, the last of which is carried by the wheel axle, and is removed when the wheel is detached. The main point is that the main chain transmission would be undisturbed when the wheel is removed. The load is all carried inside the wheel centres. It is claimed that a rolling motion to the wheel is obtained without lateral movement. Any arrangement of springs could be used. The illustration clearly shows the principles involved.

An Adaptable Device.

Fig. 7 illustrates the Billington device, which, it will be seen, is so designed that it can be used readily to convert existing models into spring frame machines. The drawing is self-explanatory. The wheel is placed a few inches further back than originally designed, the existing "fork" ends being fitted with studs, which carry the spring bolts. The side plates of the device are slotted to clear these studs. The springs are adjustable,

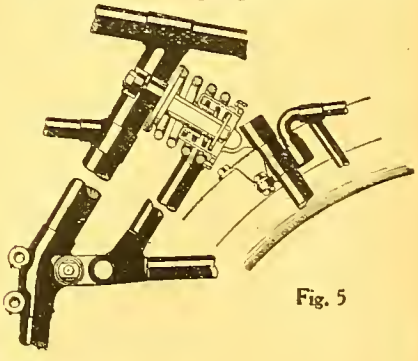


Fig. 5

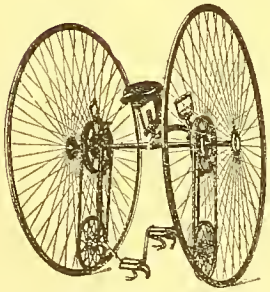
1854 1918

From the Days of the Crimea

SOME EPISODES IN

B.S.A. HISTORY.

AN EARLY B.S.A. PRODUCTION



The "Otto" Bicycle made in 1880 by The B.S.A. Company.

ONE of the first bicycles manufactured in quantities by The Birmingham Small Arms Company was the "Otto" Safety Bicycle. Instead of one wheel behind the other as is usual in the modern cycle, this curious old mount had its wheels side by side, and it was no easy matter to achieve the balance necessary before comfortable riding could be obtained. From those early times the B.S.A. Company has been closely associated with cycle construction, and riders of B.S.A. Bicycles and Motor Bicycles are to-day enjoying the results of knowledge gained through years of research and practical experience.

THE BIRMINGHAM SMALL ARMS COMPANY LIMITED.
BIRMINGHAM.

Fame Speaks

At last my tongue is loosed and the rigid silence which my captors have imposed is broken.
Why, in addition to using—I thought at first misusing—my fair figure as an identification mark for their "steed," they chose to silence me is strange—
Strange, indeed, when as "the Goddess of Rumour" or Flying Report my very nature is to use my tongue for good or ill—when even my name in its original form meant "speak" or "say"—
Still the past is past, and with the present—freedom.
And being freed I shall speak of the mount with which I am identified—a worthy "steed" known as the

CLYNO

The Sidecar Motor Cycle

and which in future will do even greater things than it has accomplished in the past.
Long Silence makes me reticent, but 'tis enough to tell you this to-day and remind you of the facts set out below—
Next week I will "say" more.

Note the Clyno Post-War Policy—
1. Mass production of one model (8 h.p.).
2. Prices competitive with any outfit of equal reputation.
3. Rotational after-war delivery.

Ask your Agent.

THE CLYNO ENGINEERING CO.,
Pelham Street, Wolverhampton.

The Figure of Fame

1561

A12

Spring Frames.—

and it is claimed that resilience is obtained with lateral stability. For converting existing rigid frame machines the invention appears to offer certain possibilities as an accessory.

Fig. 8 is the patent of designers directly connected with the motor cycle manufacturing world—J. J. Richardson and F. T. Downes. The rear wheel is carried in a frame pivoted at its lower end and connected to the frame proper by springs. The weight is carried by compression coil springs, while provision is made for absorbing reaction shocks.

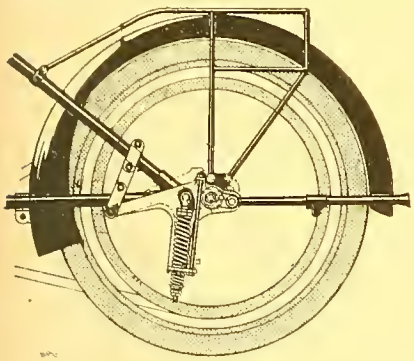


Fig. 7.

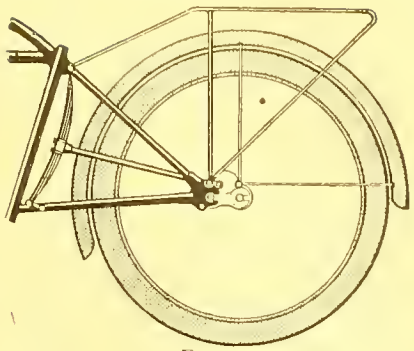


Fig. 6.

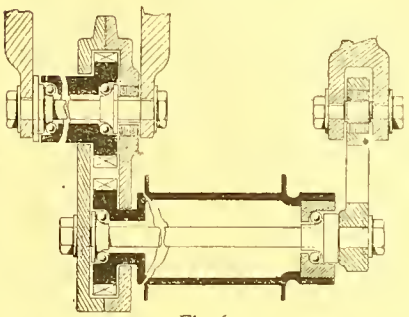


Fig. 6a.

In addition to such inventions as are patented, there are many other designs submitted to us daily by readers who have worked out the springing problem for themselves. Most of these, however, are designs already covered by patents which have been reviewed in our pages.

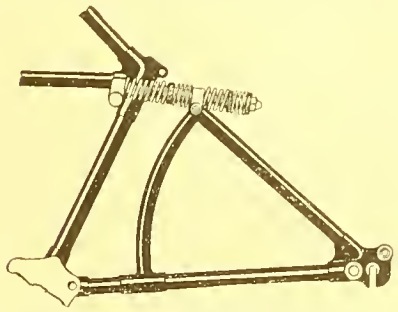


Fig. 8.

Others are impracticable. There is no lack of evidence to show that the need for a frame-springing device is now acknowledged by the majority of thinking motor cyclists and designers, and in the near future the spring frame may be the rule rather than a rare exception.

It simply resolves itself into the old question—Will the manufacturer stoop to satisfy the demands of his customers?

ONE-LEVER CARBURETTERS?

A Question of Education in Theory and Practice.

DID anything ever sound nicer? One-lever carburetters are the goal of all our ambitions, as motor cyclists hoping and working for a millennium. But will the provision of a carburetter designed to work efficiently under the control of one lever bring that millennium any nearer? My opinion may be open to challenge, but I think that at the present time a one-lever carburetter would be anything but an unmitigated blessing, and my reason is that its efficient use rests and relies upon the development of a very abstract thing—education. And because a thing is abstract its development is difficult. Let us investigate.

Constant Speed.

A one-lever carburetter has to all intents and purposes one permanent setting only (I refer, of course, to its setting under travelling conditions). That setting is made for one particular engine speed—*i.e.*, the most efficient engine speed possible, and the speed at which the engine will give its greatest power output. So long as the engine is running at that speed the one-lever carburetter is excellent. So long as you are keeping your engine at its most efficient speed of revolution you will benefit from the fitting of a one-lever carburetter, which admits a mixture calculated to run the engine at that speed and at its highest efficiency.

But how many motor cycle engines are run at anything like a constant speed? And there is only one efficient speed with the mixture provided—and fixed—by the one-lever carburetter. If a motor cycle were run normally under the same conditions as a lorry engine, the one-lever carburetter would equip the former as well as it does the latter. The lorry or 'bus engine runs at a fairly constant speed—a factor that is carefully looked after by changes of gear (in some cases automatic) as load increases, and so engine speed tends to slacken. Consequently the mixture that will give the best results can be predetermined, and the carburetter to give that mixture can be fitted to the engine with the knowledge that its opportunities of efficient working will be in the ascendant.

What happens in the case of an automatic one-lever carburetter mounted on a motor cycle engine? How often is a labouring engine relieved by well-timed changes of gear? The engine slows down, and has to run on a mixture determined previously as the best for the running of that engine *at another speed*. Thus the speed varies, but the mixture remains constant. Does this make for efficiency? So long as the rider will keep his engine turning over at its best speed, so long is the automatic carburetter a success.

Educating the Motor Cyclist.

To get up a freak hill on an abnormally high gear is the ambition of every motor cyclist I have met, and to do this he must have a carburetter that will give a variable mixture—in other words, that will make his engine slog at low speeds but not refuse to turn over at high. This is where the education comes in. Educate the motor cyclist to see and to practise the golden rule that constant engine speed (when travelling under load, of course) is the proof of efficient driving, and he will use his gear lever more and will need his air lever less. Then we may have one-lever carburetters; but let us make sure first that the education has really sunk in and is not mere camouflage, soon to give way and reveal a reversion to type: because if that happens the one-lever carburetter will have to go, and then we shall have to start all over again.

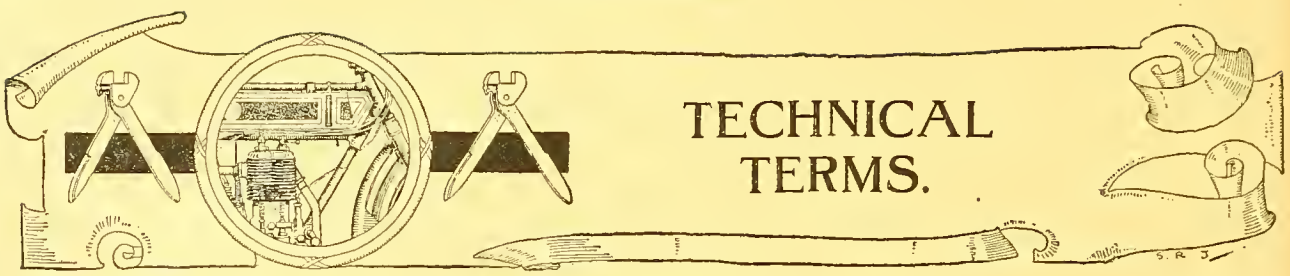
An interesting commentary on this argument is provided by the relative petrol consumptions of motor cycle and motor lorry engines. It is a very good motor cycle that will do twenty ton-miles to the gallon—the average is about fifteen; but many lorries average as much as fifty ton-miles per gallon! In other words, if a motor cycle ran as efficiently as a lorry, the normal consumption of an 8 h.p. sidecar outfit, weighing perhaps 5 cwt., would be in the neighbourhood of 250-300 m.p.g. RAMA.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.



TECHNICAL TERMS.

SOME REMARKS ON VARIOUS TERMS USED, AND OFTEN WRONGLY USED, BY MOTOR CYCLISTS.

The meaning of certain technical terms is far from being always correctly understood, and the following series of articles by "Rama" is intended to elucidate in simple language their individual meaning. It is assumed throughout the series that the reader is acquainted with the working of a motor cycle. Discussion on any interpretation of these terms which may be at variance with the usual ideas of our readers will be welcomed. (*Previous articles of this series appeared in the issues of March 7th and April 4th.*)

PART III.—UNITS OF POWER AND WORK.

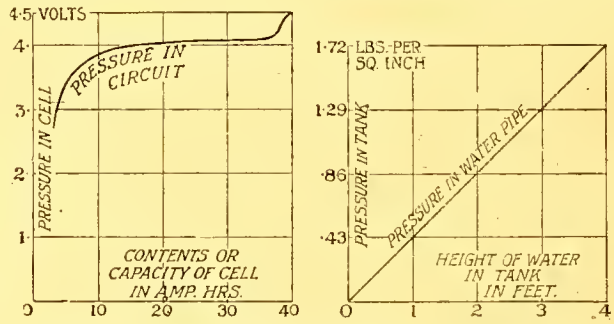
IN my first article I dealt with thermal efficiency, and tried to show briefly how heat can be converted into work, or thermal into mechanical energy. It is now generally accepted that all energy —or the capacity for doing work—in whatever form it is manifested, is essentially the same. In other words, mechanical energy is the same as thermal or electrical energy in fundamentals, and the different forms are interconvertible, in theory at least, and generally, though not always, in practice. Thus, if we have a steam engine, a water wheel or a windmill providing a revolving shaft, we may convert the mechanical energy into heat or electricity, or we may retain it as mechanical energy and use it to drive machinery. If retained as mechanical energy to drive machinery, that which is not converted into potential energy—as, for example, by lifting a weight or compressing a spring—is theoretically dissipated in the form of heat.

Measuring Energy.

Each form of energy has its own units. Thus we measure electrical energy in electrical units, mechanical energy in mechanical units, and heat by thermal units. As heat is generally considered the most fundamental of all the various forms of energy, we will take the heat units first. The amount of heat required to raise 1 lb. of water 1° Fahr. in temperature, when the water is at its greatest density, is known as the British thermal unit, and is written B.Th.U.

Now, as heat may also be expressed as mechanical energy, British thermal units may be expressed as, or converted into, mechanical units, in the form of which they do work, which is most simply measured by the unit known as the foot-pound. This is the amount of energy required to raise 1 lb. through a height of 1ft. The energy that will raise 33,000 lb. through 1ft. in one minute or 1 lb. through 33,000 feet in the same time is known as 1 h.p., and one British thermal unit per minute =.02357 h.p., or 42 British thermal units per minute is approximately equivalent to 1 h.p.

Thus if we know that a gallon of ordinary petrol contains 20,000 British thermal units—which it does, approximately—one gallon of petrol should be capable of giving us $\frac{20,000}{42}$ = 476 h.p. for one minute, which, of course, is much more than would be obtained in practice from any known engine. The explanation of the discrepancy is to be found in my first article dealing with the question of thermal efficiency.



Graphs showing the variation of pressure in an electric circuit and in a water pipe with the emptying of the accumulator and reservoir. The fall in water pressure, it will be seen, is at a constant rate; that in the electric circuit is, however, at first rapid, then almost nil, and then rapid again (The curve is, of course, purely ideal.)

Electrical Units.

Turning now to electrical energy, we shall have to tackle the question of electrical units of work in a rather roundabout way. There is, perhaps, no simpler way of doing it than by explaining the meaning of electrical units in common use. But first and foremost let me point out that the words "current" and "flowing" as applied to electricity probably have no justification in fact. They are nothing more than simple terms that conveniently express some little-understood phenomena, and are useful to serve as explanations, or rather illustrations in a popular way, up to a point which is far enough for practical, though not for scientific, purposes.

The coulomb is the unit of electricity; that is to say, it is equivalent, we will say, to a pint as a measure of water.

The ampère is the unit of current, and current is the rate of flow in coulombs per second. In other words, the ampère is equivalent to so many pints per

Technical Terms.—

minute of water flowing through a tap, and the volt is the unit of electro-motive force, or pressure. The oldest analogy for explaining these terms is, perhaps, the simplest and best. Imagine a tank of water with an outlet pipe at the bottom controlled by a tap. If the tap is turned on, the quantity of water that comes through the pipe will be measured in pints or quarts. If we had electricity flowing along a wire instead of through a pipe, the amount that came through would be reckoned in coulombs. If one coulomb came through per second, the rate of flow would be one ampère. Taking again (for purposes of illustration) one coulomb as equivalent to one pint of liquid, one ampère of electricity flowing for an hour would be the same as 3,600 pints per hour as the rate of flow of water, *i.e.*, at the end of the hour, 3,600 coulombs would have passed along the wire.

Pressure and Quantity.

Now the water in the pipe leading from the tank would have behind it a certain pressure which, incidentally, we may say would be .43 lb. per square inch for every foot the water was deep. Thus if the cistern were 10ft. deep the pressure in the pipe, assuming this were horizontal, would be 4.3 lb. per square inch. Similarly the electrical pressure due to the energy in the accumulator or dynamo, or whatever replaces the tank of water, is reckoned, though not in pounds per square inch, but in volts. As the water falls in the cistern, so the pressure in the pipe, of course, will decrease, but the amount of water passing through will not materially alter until the tank is practically empty. Of course, if the cistern is replenished with a pump (analogous to a dynamo) the pressure remains unaltered. The same applies to the flow of electricity, with, however, this difference: Whereas the fall in pressure in the case of the water is directly proportional to its depth from the beginning of the running to the end, this is not the case with an accumulator. With a fully charged accumulator the pressure falls rapidly for a short time, and then remains almost constant until the accumulator is practically exhausted, when it falls rapidly again. This may be shown by a rather simple diagram reproduced, which also illustrates the analogy and difference between the water and electrical reservoirs.

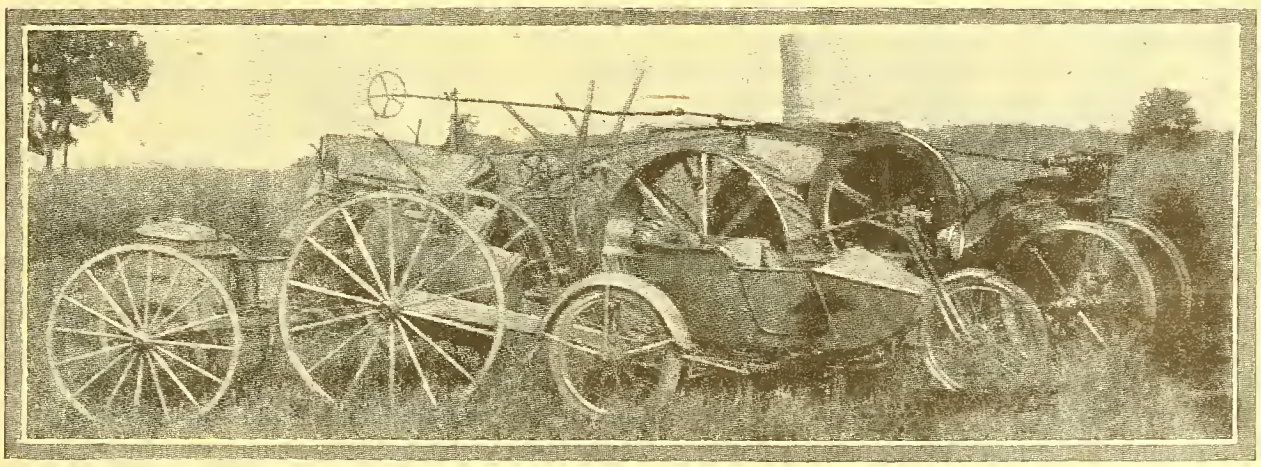
The Units of Capacity and Power.

The expression ampère-hour is one that baffles many people. It is the unit of capacity of an electrical reservoir such, for instance, as an accumulator. An accumulator with a capacity of one ampère-hour is capable of supplying one ampère for one hour; in other words, 3,600 coulombs. Similarly, a 40 ampère accumulator will supply, theoretically, one ampère for forty hours, or 40 ampères for one hour. Incidentally, it may be as well to point out that if an accumulator of this capacity were emptied at the rate of forty ampères in one hour it would be irretrievably ruined, but this has nothing to do with the theory of the matter.

The only other unit that need trouble us is that of electrical power. This unit is described as the watt, and is obtained by multiplying volts by ampères in the case of any source of current. Thus a 4 volt 40 ampère accumulator is theoretically capable of providing 160 watts for one hour. Similarly, a dynamo of 50 volts 5 amps. will provide 250 watts as long as it is running.

One watt = .00134 h.p., or 746 watts = 1 h.p. That is to say, 746 watts are able to provide the energy to raise 33,000 lb. through one foot in one minute—in other words, they are the equivalent of 42 B.Th.U. For the purposes of convenience, in commercial negotiations the watt is generally replaced by the unit of one kilowatt, which is equivalent to a thousand watts, and is written K.W. One kilowatt per hour is the Board of Trade electrical unit, and is written B.T.U. One kilowatt-hour (written K.W. hour) = 1,000 watt hours = 1.34 h.p. per hour.

I will conclude by emphasising the difference—which is often overlooked—between one B.Th.U. (British thermal unit) and one B.T.U. (Board of Trade electrical unit). One B.T.U. = 56.28 B.Th.U., as I have tried to make clear above.



THE MOTOR CYCLE ON THE FARM.

We recently showed an illustration of a motor cycle being utilised as a farm tractor. The above photograph shows a sidecar outfit employed to act as tender to a tractor, and dragging a four-wheeled trailer carrying big reservoirs of oil and water.

Current Chat

Times to Light Lamps.

SUMMER TIME.

July 18th	... ...	9.37 p.m.
,, 20th	... ...	9.35 ,,
,, 22nd	... ...	9.32 ,,
,, 24th	... ...	9.29 ,,

Petrol in U.S.A.

During March, American refineries produced 217 million gallons of petrol.

Frame Design.

Mr. Starley, the well-known inventor, promises something good in motor cycle frames at an early date, which will incorporate his recent patent, the fan tangent spoked wheel.

War-time Michelin Maps.

The Michelin Tyre Co. is busy preparing guide books to the battlefields of France and Flanders, on similar lines to its well-known tourist maps of pre-war days. The French edition has already been published.

The Motor Users' Protection Association.

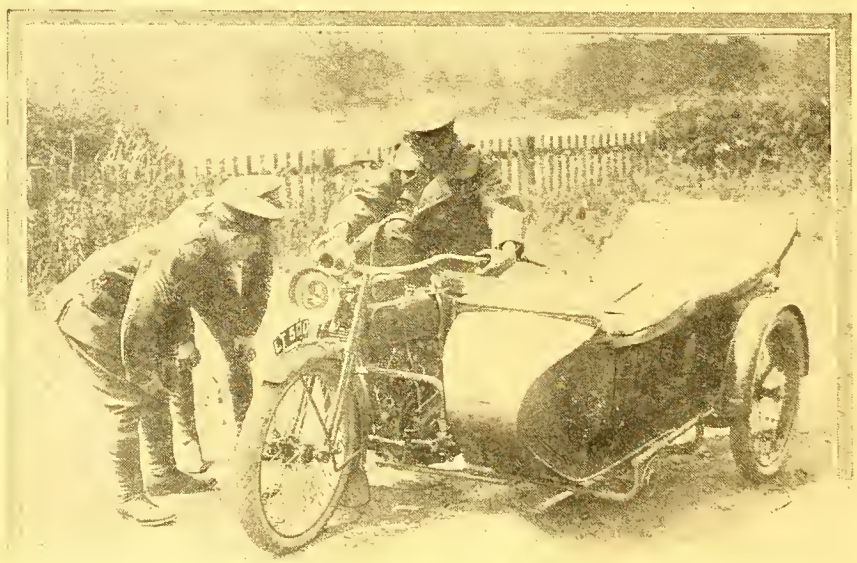
The general meeting of the Motor Users' Protection Association, which was advertised to take place on July 19th, is postponed, as it has been found impracticable to prepare the necessary printed matter in time. Due notice will be given as to the future date upon which the meeting will be held.

After 20,000 Miles.

One of our readers who is engaged on Government work recently purchased a second-hand cycle car. This machine had been under his observation for at least three years, and its late owner had obtained very satisfactory results, the only troubles being an occasional broken chain. During the first week that the vehicle was in the new owner's hands the back wheel cones locked up, and cursory examination revealed that there was nothing to prevent this from happening when the car was reversed. It turned out that the original owner, during three years of running, had never used the reverse. He might have been called a "'bus pusher."

A Little Learning.

In reading a daily paper the other day, the truth of Pope's line that "a little learning is a dangerous thing" was brought very forcibly to our notice. The writer of the article, while referring to Tanks, gave the literal translation for "Sturm-Panzer-Kraft-Wagen" as "assaulting armoured strength vehicle." Evidently the translator knew very little of the Hun language; and on looking up the word "Kraft," the translation was probably found to be "strength" or "power." The first of the two words was taken at random, and this was obviously the wrong one. "Kraft-Wagen" is literally a "power vehicle," and the literal translation is practically correct.



A wayside snapshot taken during the recent one-day despatch-carrying test of the Middlesex Motor Volunteers. A Harley-Davidson owner "starting up."

Special Features.

IN 1923:

SOME PROPHECIES OF 1913 BRIEFLY REVIEWED.

A NEW MOTOR-ENGINED BICYCLE.

A New Use for the Petrol Engine!

Another war novelty is a machine used for collecting scrap barbed wire in the fighting area. The machine, which remotely resembles a straw elevator, runs on a caterpillar chain track. The wire scrap is picked up and cut into lengths and then dumped into cars or baled.

After the War.

How many of those agitators for our post-war millennium have really given any serious attention to the subjects they so glibly discuss and the problems they so consummately solve?

A Suggestive Book.

"Trade as a Science," by Ernest J. P. Benn, is a book on commercial problems, present as well as future, written by a man who does know what he is talking about. And when a man knows anything about trade, and is also able to think and say what he thinks, any book that he writes must be worth reading. This one certainly is.

British Trade—the Controllers of its Destiny.

This is how we do—or did—things in matters commercial (the information is from Mr. E. J. P. Benn's book on "Trade as a Science"): "On March 7th, 1916, a deputation waited upon the Prime Minister to present to him certain resolutions passed at a meeting at the Guildhall, London, to consider trade after the war. The deputation consisted of two Lord Mayors, two Sheriffs, three members of the House of Lords, one accountant, and Sir George Alexander."

Economy of the Auxiliary Engine?

A small engine does not necessarily mean very low petrol consumption. At a recent petrol consumption trial in Rochester, U.S.A., the winning machine in the lightweight class was a Dayton motor wheel. This wheel takes the place of the front wheel of a more or less "standard" pedal cycle. The petrol consumption was 25⅝ miles on a quart of fuel, or approximately 101½ m.p.g. Much larger engines produced in this country, both two-stroke and four-stroke, do better than this under ordinary conditions. A properly tuned 3½ h.p. machine of British manufacture can do 100 m.p.g. or so, depending on the driver.

24in. Wheels.

A trade prophet advises us that there will be no machines fitted with 24in. wheels after the war.

The "Z" Pass.

It is learnt that the "Z" passes issued by the Government entitle holders to drive at a reasonable speed above twenty miles an hour.

Reversing the Use of Metals.

Present-day practice is to have the cylinder of an engine of iron and the crank case of aluminium. Future designs may have aluminium cylinders and sheet steel crank cases.

Oil Wanted.

If all petrol-less motor cyclists who are now riding their old bicycles would give the machines the same attention as they bestowed upon their motor cycles, the countryside would be quieter.

Internal Combustion Turbines.

The name of the general manager of a well-known motor cycle concern was mentioned recently in a list of patent applications as having applied for a patent in connection with internal combustion turbines.

Vaporisers.

We are not hearing much about vaporisers for heavy fuels of late. This can well be understood when those who are allowed to use paraffin are permitted to use petrol. But when the fuel restrictions are removed we may see a revival of interest in the vaporiser. Certain it is if the price of paraffin is much below that of petrol there will be thousands who will wish to economise.

Railway Fares.

To the motor cyclist who has been used to taking his holidays awheel the 50% increase in railway fares is more than a bugbear. Before the war he was able to carry himself and his family to the sea for a few shillings, and there was an enormous saving as compared with "tourist" fares of those days. Then tourist tickets were withdrawn, and finally 50% added. It goes against the grain for a petrol-less motor cyclist to spend £5 or £6 in railway fares for a trip that used to cost not many more shillings.

Records in Automobile Supply.

Mr. Willys, of Overland car fame, has been talking of what America has done for the Allies in the way of supplying automobiles. Mr. Willys claims that the U.S.A. has beaten all records by supplying in the first three years of the war no fewer than 45,308 vehicles.

The Fiat Co., of Italy, points out that this company alone has supplied more than 40,000, *including many for the American Army in France*, and that there are eight other factories in Italy which together have supplied far more than the 5,000 odd vehicles necessary to upset the American claim.

Motor Cycles from Italy?

Italy is a dark horse so far as motor matters are concerned. She has become second only to the U.S.A. as a motor exporting nation, and the Fiat is the biggest motor factory in Europe.

Italian Coventry par Excellence.

Turin alone gives employment to no fewer than 70,000 persons in the motor and allied industries.

Another Tunnel Scheme.

If the proposal to connect Gibraltar to Africa by tunnel is carried out we may expect reliability trials, Dover to the Cape!

Winner of a Red Cross "Draw."

Mr. Robert Wilding, of Wigan, drew the winning number in the ballot for a Wolseley car, organised by Mr. John Pepper, of Shelton, Staffordshire. The sale of tickets realised £1,320.

The Long Stroke Engine.

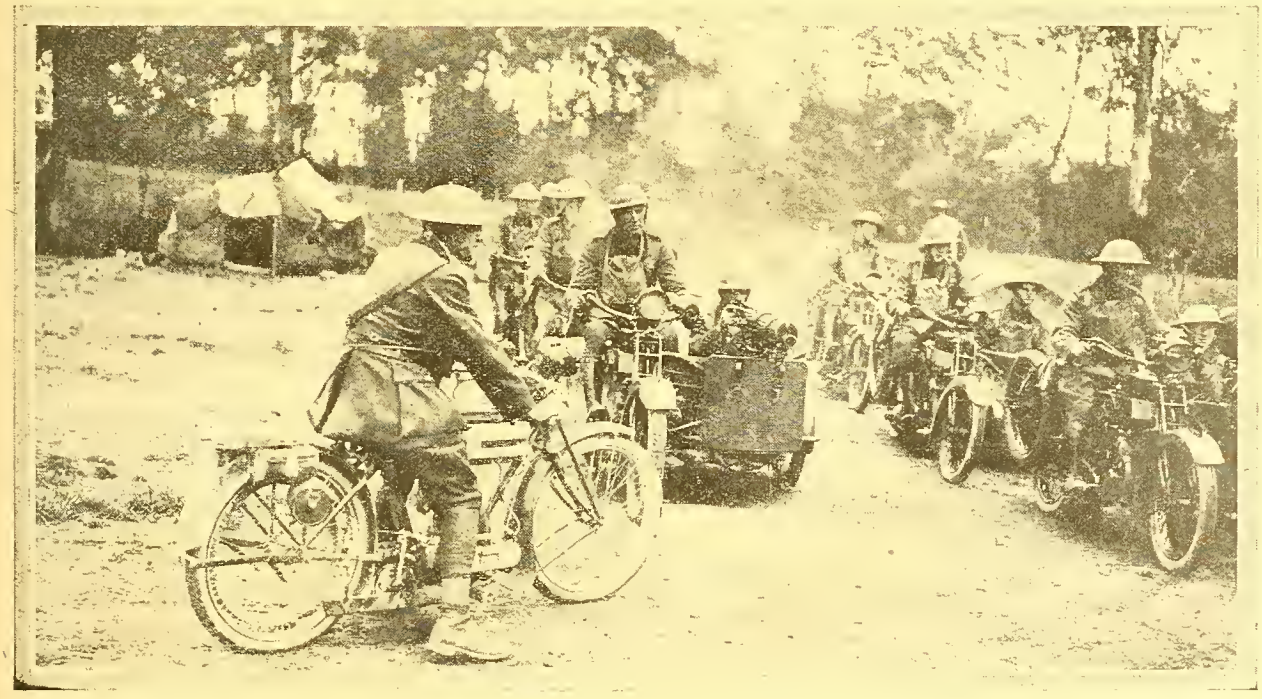
With all the talk of long stroke engines for motor cycles, there are no engines in this branch of motor engineering having the long strokes of some of the car engines. 60 × 120 mm. is the size of the engine in the 9 h.p. Hillman light car. A twin with cylinders of these dimensions would have a capacity of 679 c.c. The 10 h.p. De Dion of 1914 had cylinders 56 × 120 mm. These *are* long stroke engines.

Two Independent Engines.

A short time ago we saw on the road a motor cycle which appeared to have a 3½ h.p. single-cylinder engine and a small two-stroke, placed tandemwise. They appeared to be connected to the back wheel independently, and both were working.

The "V Four."

A few years ago the Peugeot concern introduced a car with a V four engine. The cylinders were cast *en bloc* and set at about 20°. The "V four" offers certain advantages to designers who wish to produce a "four" but desire to retain the present-day transmission systems. The Douglas concern produced such an engine a few years back.

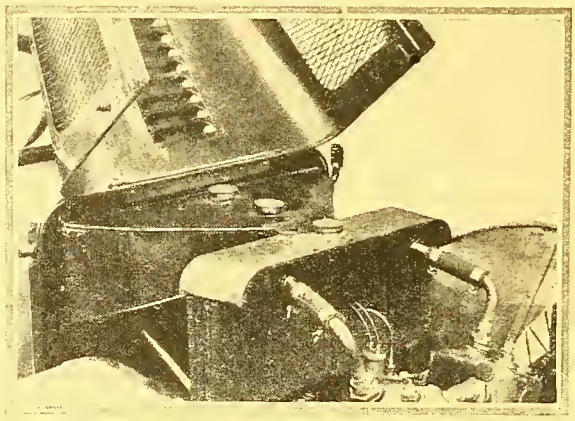


Very little is heard at the present time of the motor machine guns in France, and many people imagined that they had been withdrawn from the Western Front. But the reverse is the case; they are doing good work there, and are very much alive, as the photograph (taken in France) shows. The machine gun outfits are Clynos, fitted with the Vickers gun.

THE MORGAN RUNABOUT.

Improvements in Body Design.

THE models of the Morgan Runabout that are being produced at the present time, which differ in no essential chassis details from the pre-war type, will constitute, as far as one can say with certainty, the post-war models. The engine is still either a J.A.P. or M.A.G. air or water cooled, although at the present time the water-cooled M.A.G. is unobtainable, consequently the engine range is temporarily restricted to three, and the only water-cooled model available has a J.A.P. engine. The Grand Prix model is practically unaltered from the previous Grand Prix models.



The new engine and radiator arrangements on the water-cooled de luxe model Morgan. The wedge-shaped petrol and oil tanks are clearly shown, as also is the wire netting replacing louvres at the rear sides of the bonnet.

One of the illustrations reproduced shows the arrangement of petrol and oil tanks, radiator and engine, with the bonnet raised on the new *de luxe* water-cooled model, and makes it quite clear how the whole of the power unit is enclosed when the bonnet is lowered. It will be noticed that the oil and petrol tank is wedge shaped, so as not to retard the egress of air from behind the radiator. The louvres in the bonnet, while remaining in the fore part, are replaced in the rear part by wire netting, and this is illustrated quite clearly in our photographs of the *de luxe* model, which, although provided with an air-cooled engine, is exactly the same as the water-cooled model in external appearance.

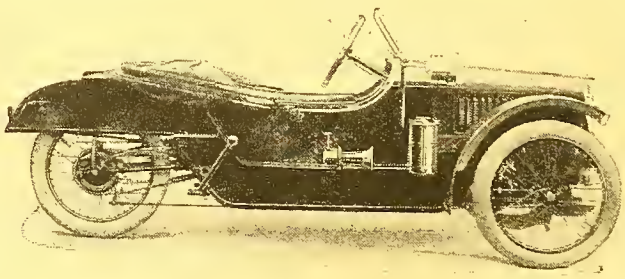
The improved appearance of the new *de luxe* models needs no emphasis, and a very commendable alteration has been made in the provision of a wider seat than that used on the earlier types. It is the present intention that there shall be no chassis alterations in the post-war model, except that the chains will be set slightly wider apart, and chain guards will be fitted as a standard feature—an excellent and useful improvement.

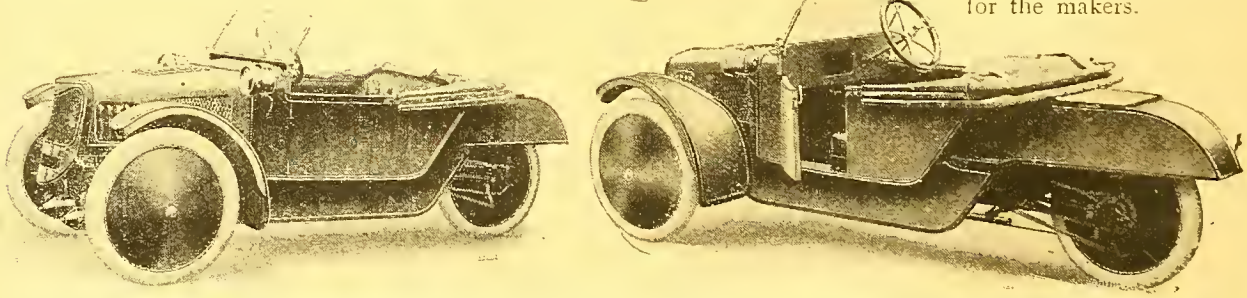
The prices of the various models at present are: Sporting model, *i.e.*, similar to the *de luxe*, but without entrance door, air-cooled M.A.G. engine, £130; *de luxe* model, air-cooled M.A.G. engine, £135, water-cooled J.A.P. engine, £145; while the Grand Prix model with water-cooled J.A.P. engine is £137.

It must be distinctly understood, however, that no model can be supplied at the present time except under Ministry of Munitions Priority Certificates.

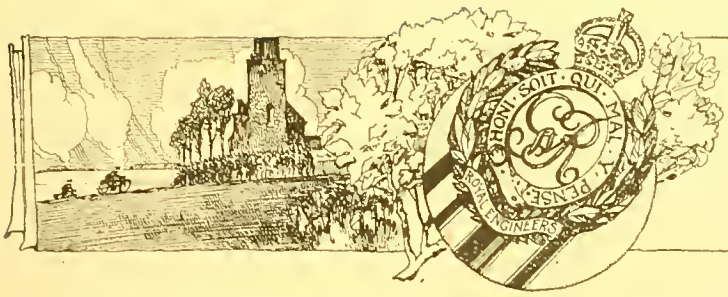
While on the subject of the body design of this vehicle, it will interest owners of these machines to know that Mr. H. F. S. Morgan has been using for some time a four-seated body, in which he has carried two adults and two children besides himself as driver. It would be folly to say there is much leg room to spare, but owing to the manner of constructing the rear part and by making the front seat to move forward there is more accommodation provided than would be thought possible. The back panel of the rear seat extends beyond the circumference of the rear wheel, the woodwork being built round the wheel, thus forming a recess in which the wheel runs. For carrying a couple of children, or three if they are small, this four-seated body is quite practical.

It is unnecessary to point out to those who have had experience of the engine power of the Morgan that there is no sign of overloading when this extra weight is carried: at the same time it provides a splendid test for the makers.





(Top) The sporting model, without door (air-cooled engine). (Bottom, left) Side view of the de luxe model, with door (air or water-cooled engine). (Bottom, right) Threequarter rear view of the de luxe model, showing the new dashboard, incorporating a recess for gloves, etc.



MILITARY NOTES.

AN AMERICAN GETS BUSY. MOTOR CYCLING TO THE O.P.

CPL. BILLY PRATT.

WE have received from Cpl. Billy Pratt a note informing us that he has been in a Red Cross hospital in Dorsetshire seven months with a smashed leg—a present from Fritz. He is still going about on crutches, and says he is getting heartily tired of his convalescence, and is anxious to start "pushing 'em back" again.

AN AMERICAN DESPATCH RIDER HONOURED.

THE first American despatch rider whose recommendation for the D.S.M. has come to our knowledge is Cpl. Ward Parker, of New Bedford, Mass., U.S.A. For work with the battery, the Major commanding has recommended Parker for the Distinguished Service Medal. All day and all night he carried messages over roads under heavy shell fire to batteries out of communication with battalion headquarters.

LT. L. PELLAT, R.A.F.

WE have lately received a letter from Lt. L. Pellat, R.A.F., who was well known in the motor cycling world before the war, and was a member of the Streatham M.C.C. He joined up and went to France in 1914, and in 1915 returned and went to Russia, where he stayed until his return to England in July, 1917. When in Russia he fought against the Turks and on the Rumanian front, and for his services in Russia he was awarded the Silver Medal of St. Stanislaus. During the whole of this time he served with the Armoured Car Section. He has now transferred to the R.A.F., and is at a training depot.

AMERICAN MOTOR CYCLE REPAIRS IN FRANCE.

A SERGEANT in the American Army gives an interesting insight into the life in a motor cycle repair shop in France. "When we arrived," he writes, "Lt. C. R. Webber saw a scrap pile of junked motor cycles, rusty and twisted. We dismantled the lot, and put each whole and slightly used part in our spare parts bin. Now we have a credit of more than $6,000 on our books in our favour. We made hybrid Harlindians by putting Harley-Davidson forks, handle-bars, and controls on Indians, made Indian front springs out of Harley-Davidson sidecar springs, put Harley-Davidson sidecars on Indians, and Indian rear wheels on Indian sidecar chassis." He points out that most of the smashes are due to inexperienced drivers, and not to any wear or faults in the machines. Most of these seem to be due to the rider's driving too fast. "What becomes of the riders," he says, "I don't know, and I don't wish to see one. They make such complete wrecks of the machines."

D.R. OF THE R.G.A.

SGT. "H. OWITZER," a despatch rider in the R.G.A., airs his opinions on the remarks of "Venus."

"I was very interested to read in *The Motor Cycle* of June 27th, under the above heading, a good-natured little 'grouse' by a D.R. of the R.G.A., pointing out that 'all is not R.E. that despatch rides.' I was a D.R. to a siege battery until June, 1917, when I stopped a 'packet' which put me in hospital for ten months. As regards the dangers of the job, may I add, without any personal sentiment, that I had been twice previously wounded, each time whilst in the saddle, the second time being from a machine gun, which also knocked two holes in the carrier and one in the rear mudguard? I only mention this to show that we are not over-distant from the Boche.

"'Venus' has omitted a very important, and also, may I add, 'windy,' part of the R.G.A. D.R.'s duties, and that is taking officers up to O.P.'s in the sidecars, after dark, and frequently over 'overland tracks' used by the infantry, to the entrance of the trenches themselves (a more forward position, I believe, than is reached by any other D.R.'s), and waiting there until the relieved officer comes back. These trips, of course, would be quite impossible except after dark, and even then it is always wise to muffle the exhaust as you get within easy hearing distance of the Hun.

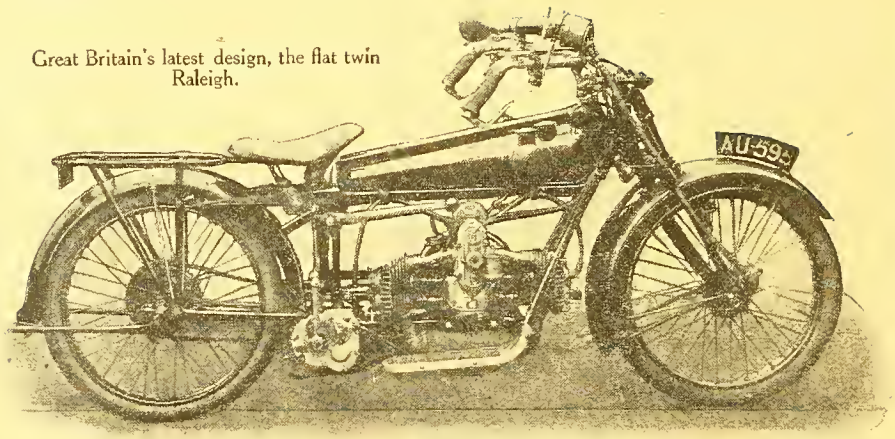
"May I also corroborate his statement that all repairs have to be done by the D.R. himself, and he very rarely has a chance of getting as far back as the A.S.C. column to obtain spares, etc.?

"Being a cripple myself now, I always envy the R.E. despatch riders who are on duty in this delightful country. It really must be 'official joy-riding.'

"I thank the 'Blue 'Un' for the help it has given me in the past, especially in helping me to obtain a petrol permit whilst in a convalescent hospital."

Cpls. Johnston and Kessell aboard Triumphs in Mesopotamia. In the background are Russian Cossacks.

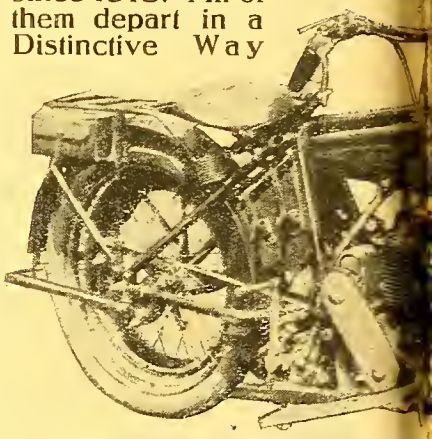
Great Britain's latest design, the flat twin Raleigh.



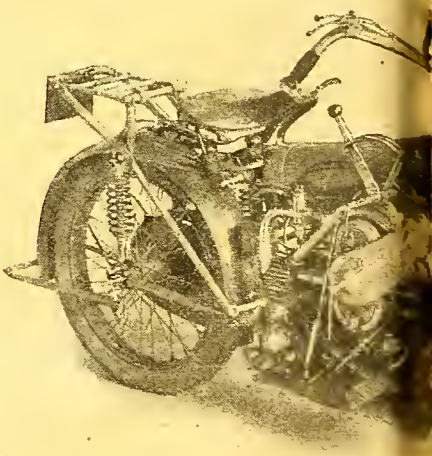
IN 19

SOME PROPH 1913 BRIEFLY

Models produced since 1913. All of them depart in a Distinctive Way



The Allon side-by-side vertical twin two-stroke ma



The Matchless flat tw

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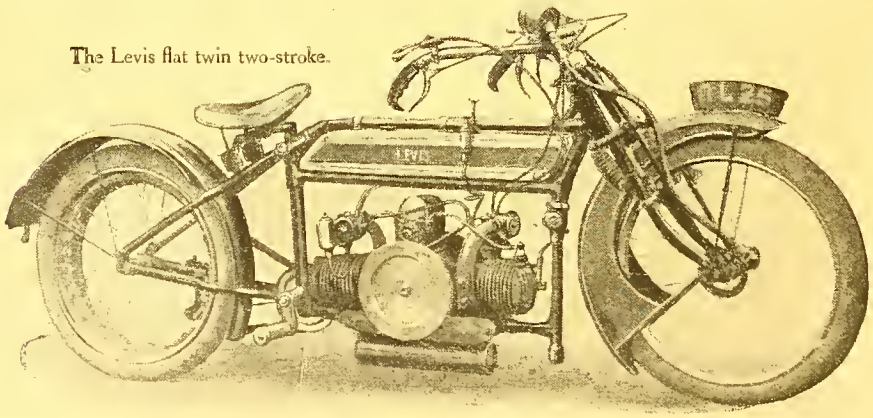
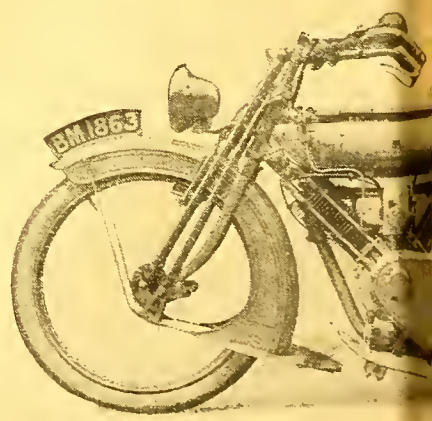
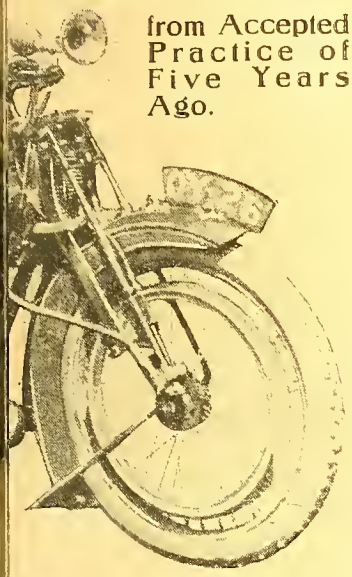
The Levis flat twin two-stroke.

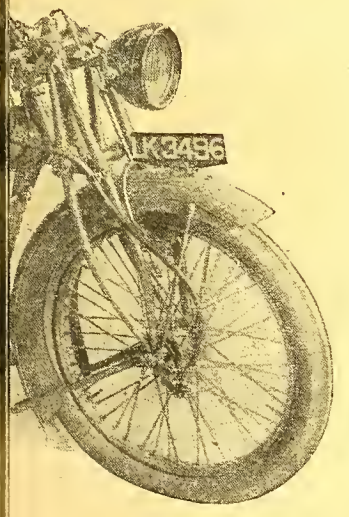




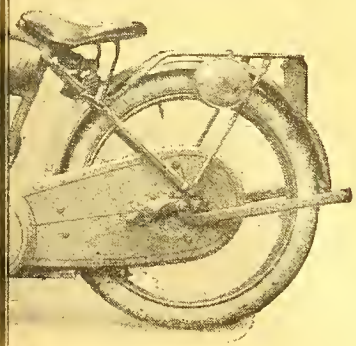
23 CIES OF REVIEWED

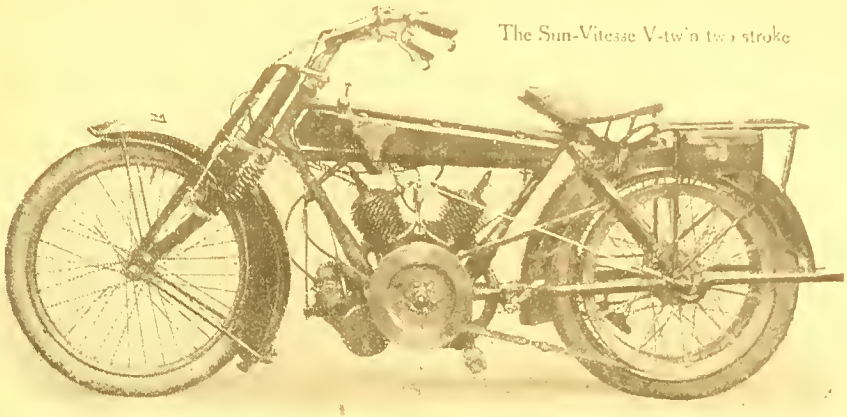
from Accepted Practice of Five Years Ago.





The P. and M. 90° twin.





The Sun-Vitesse V-twin two stroke

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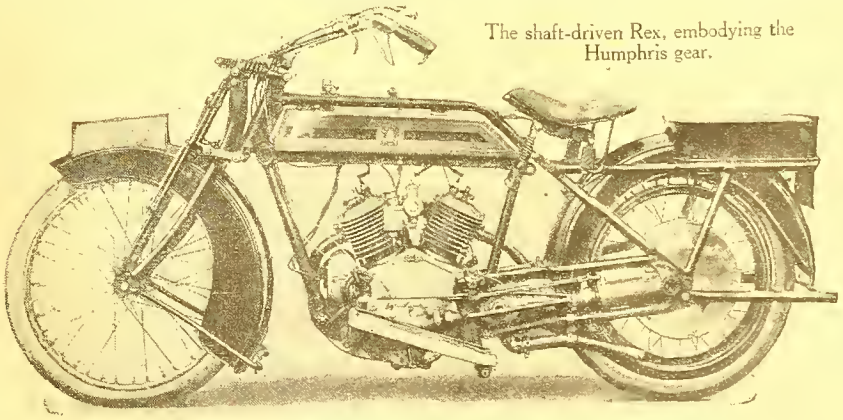

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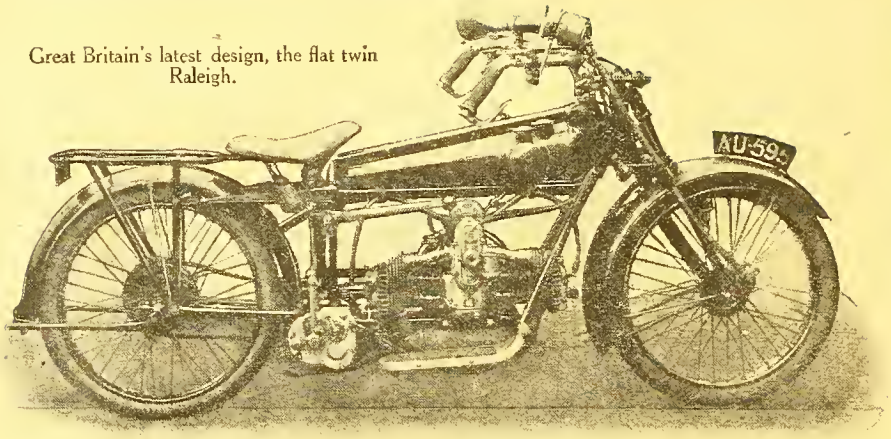

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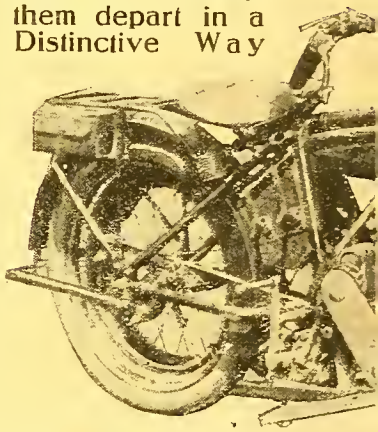

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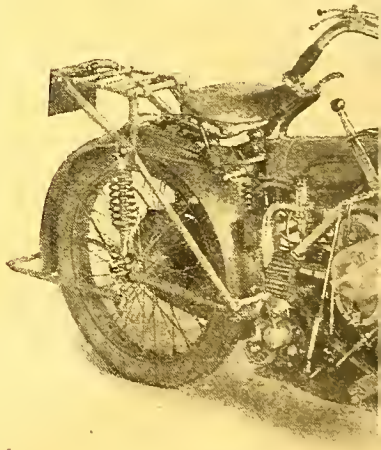

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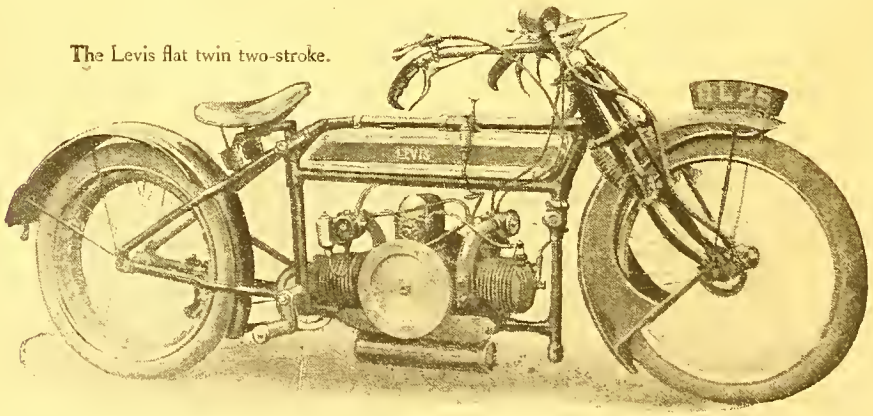

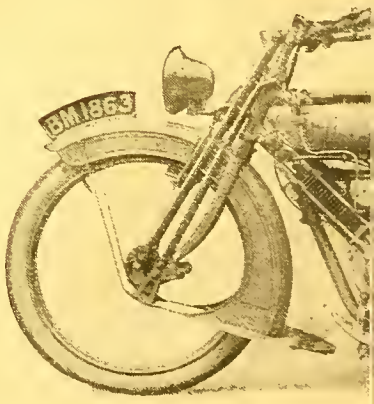

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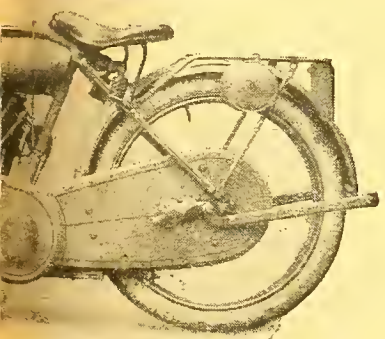

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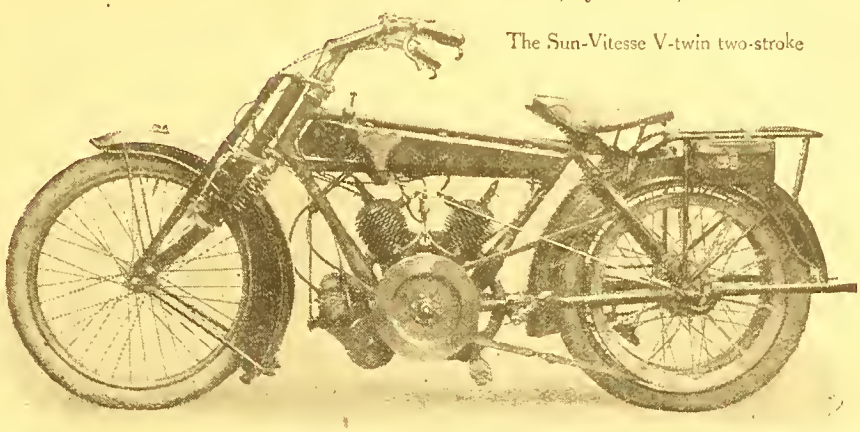

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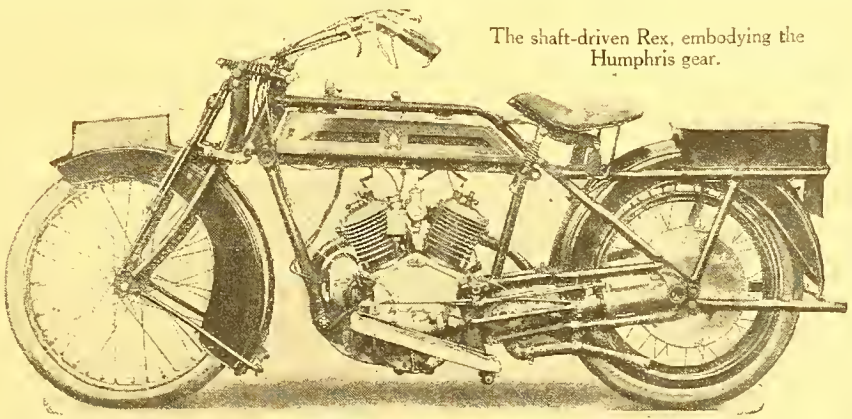
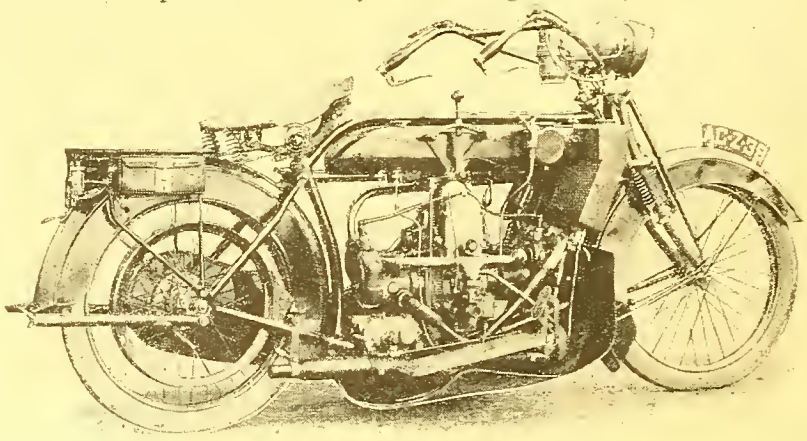


In 1923.—

the chain as being almost universal five years hence. The same number predicted hydraulic transmission, but while undoubtedly automotive engineers are nearer to a satisfactory solution to this problem than they were in 1913, nothing has been done which justifies one giving it the same importance as the chain.

Several prophets mentioned four-cylinder engines, but very few referred to flat twins. One only mentioned the flat twin two-stroke, and one other predicted electric power. The former is coming to the fore; the latter is no nearer realisation than in 1913.

Among the many other points mentioned were engines of the Diesel principle, gas turbines, electric starting, infinitely variable gears, and new fuels.



6 h.p. flat twin water-cooled Humber.

To summarise, very few of our fifty-seven friends guessed right if the trend of design to-day is any true indication (which seems to be more than likely) of what it will be in 1923.

The spring frame appears to be the only item mentioned generally which appears to be influencing design.

Dynamo Lighting and Coil Ignition.

Questions Suggested by American Car Tendencies.

FROM the controversies which occur from time to time in the motoring press between the doughty champions of magneto ignition and the no less doughty champions of battery ignition, it would seem that, as regards efficiency and reliability, magneto ignition has but little if any advantage over battery ignition. Especially does this conclusion appear forcible in view of the fact that battery ignition has found favour with a number of American manufacturers of quality cars who have had no reason to hold cost as a cardinal consideration. Granted that the one system is the equal of the other in points of efficiency and reliability, it is evident that the decision to adopt battery ignition was due—the question of cost being eliminated—to its giving advantages in connection with engine design. We may surmise that one difficulty encountered by the designers was the provision of an engine drive for the dynamo. Battery ignition obviated the need of an additional engine drive, for the drive originally intended for the magneto became available for the dynamo.

The Future Demand for Electric Light.

A desideratum of motor cyclists is the dynamo lighting set, and the statement that electric lighting will become general on motor cycles just as it has on motor cars is not likely to be regarded as a false prophecy. The considerations which in many instances have led American manufacturers away from the magneto to battery ignition are identical with those which the British motor cycle manufacturer will have to examine when he sets out to meet the demand for electric lighting. He can retain the magneto and fit a dynamo lighting set entirely apart from the ignition, or he can discard the magneto and utilise coil ignition in connection with a dynamo and battery—that is, the dynamo would charge an accumulator to which would be connected the lighting and ignition circuits. The first option requires the provision of suitable drive, bracket and fittings for the dynamo: this in many cases will be a perplexing problem, the solution of which will often incur alterations to the engine and frame. The combined lighting and ignition system would necessitate but little, if any, alteration in design. The drive and bracket now used for the magneto would equally well serve for the small dynamo, which, as far as base dimensions and spindle height are concerned, could be the same as the magneto.

The Failure of the Old Coil Ignition.

An accumulator is an essential unit in both cases, and so no advantage on this score is due to either system. The failure of the early coil ignition system was largely due to the accumulators. They were subjected to excessive vibration, and accumulator manufacturers were not then able to produce an accumulator for which the claim could be made that it was vibration-proof. The present-day accumulator is practically impervious to vibration, as is evidenced by the long service given by car lighting accumulators—in some cases five or six years.

So far the only electrical question for the manufacturer has been that of ignition, but now comes the further question of electric lighting, and a weighing of the pros and cons suggests the likelihood of the long-established magneto meeting a place disputant in battery and coil ignition.

A. E. CHESTER.

"The Importance of Being Earnest."

The Australian Government recently cancelled all German patents in Australia, numbering some 800. The home Government has received 1,310 enemy alien patent applications, and, to the amazement of many, has granted no fewer than 944 to Germans since the outbreak of war!

THE MOTOR CYCLE

AVIATION SECTION

Maj. J. T. B. McCudden Killed: American Bombing 'Planes.

Railways to be Equipped with Anti-aircraft Guns.

American railways running along or within a few miles of the Atlantic coast will be utilised to carry anti-aircraft guns in the event of a German aeroplane raid.

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An Improved Tank.

An improved detachable fuel tank has been invented by Mr. Lot, of Toronto. The moving of a lever throws the tank clear of the machine, whatever its position or angle. The new device, while cutting off the tank, provides for the feeding of the engine for sufficient time for a safe descent in the case of fire or explosion.

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Surprise Visits.

The aircraft production sub-committee of the Senate Military Committee has planned a surprise visit upon some of the aircraft plants of the U.S.A. The five Senators will slip quietly out of Washington, and appear at the least to be expected point of their proposed itinerary, and delve straightway into the work of investigating at first hand. The results—improvements or strikes?

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Col. Cody.

The late Col. Cody, who was killed during a flight on Laffan's Plain, Farnborough, nearly five years ago, was a brave man, and came very near being a great one; but perhaps his simplicity was his greatest charm. The writer remembers a little incident when the small son of a prominent technical journalist, a wee tot aged about six, and *persona gratissima* at every aerodrome, solemnly looked over the machines prior to the flight round England. He came to Cody's bulky "cathedral," and regarded it, sucking a thoughtful thumb. "I don't think *that* one will break, daddy," he said. The hard-bitten old pilot was frightfully bucked, and regarded it as a happy augury.

The Camouflage Artist.

The British aeroplane appears to be one of the few things that has still escaped the attentions of the camouflage artist. The German planes are a particularly cheery sight on the rare occasions on which they come low enough to be observed. The Americans show a nice taste and no little humour in the decoration of their machines—happy attempts to relieve the colourless monotony of war.

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Maj. J. T. B. McCudden Killed.

Maj. J. T. Byford McCudden, V.C., D.S.O. (twice), M.C. (twice), M.M., the airman star who brought down fifty-four Huns, has been killed in an accident.

He had been home recently acting as instructor in aerial fighting. On Tuesday last week he left the South of England in a fast scout to rejoin his squadron in France. Near the French coast his machine dived to earth, and he was dead when picked up.

McCudden, who was only twenty-three, and was made a major recently, went out with the B.E.F. as a mechanic, and was an aerial observer at Mons.

Maj. McCudden was of a flying family. His eldest brother, Flight-Sgt. W. T. J. McCudden, was killed at Gosport in 1915. Of two other brothers, Sec.-Lt. J. A. McCudden, M.C., R.F.C., was killed, and the other is still in the Air Service.

American Bombing Planes.

Mr. W. F. Bullock, the *Daily Mail* New York correspondent, said last week the first bombing machine completely manufactured in the United States, and equipped with a Liberty engine, has made its first official flight in the presence of officials of the British and American Governments. Its success was complete. This plane was christened the Langley, in honour of Professor Langley, one of the pioneers of aviation. It rose from the ground, climbing in wide circles.

—◇□◇—

The Liberty Engine.

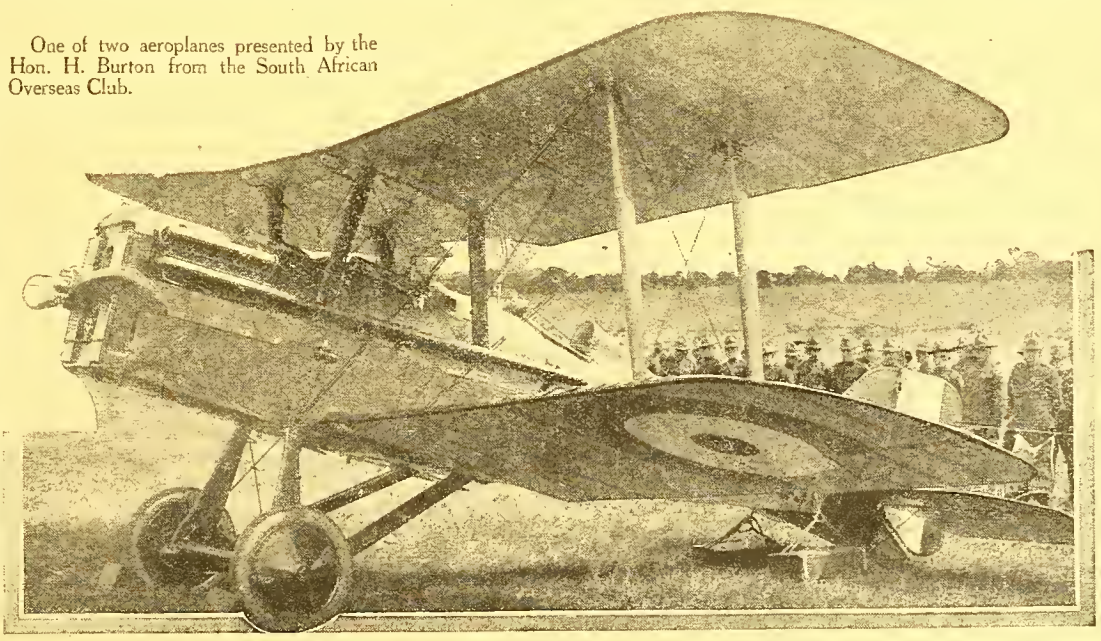
From the *Aerial Age:* "Tests of the Liberty motor made in England place the engine at once in the first line of high-powered air engines," the British Air Minister cabled to Lord Reading.

"The British technical authorities," said the message, "have reported to the Air Minister that the Liberty engines have now been subjected to sufficient air experiments in England to warrant confidence in this engine. Excellent results have so far been obtained, which place the engine at once in the first line of high-powered air engines."

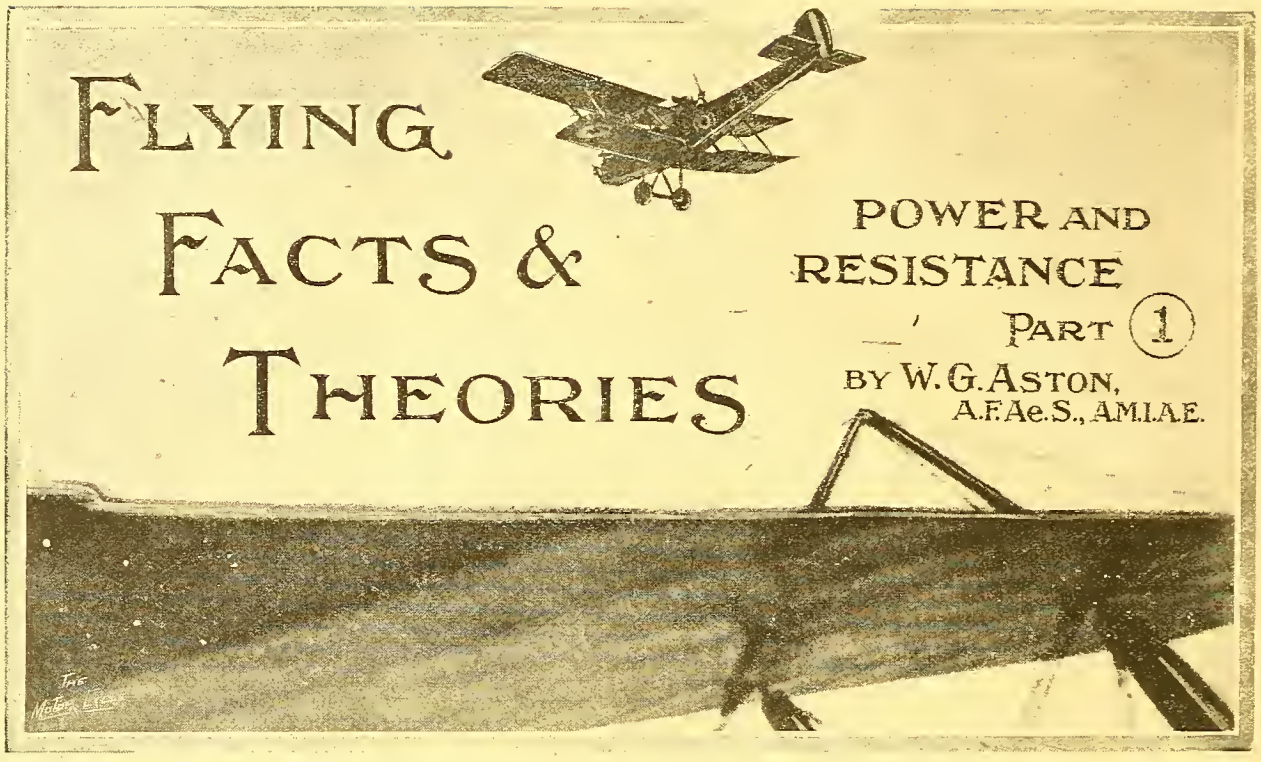
—◇□◇—

Another Point of View.

Apparently the *Aerial Age* is emulating *The Autocar's* "Cockshy for Critics." The English R.A.F. engine found a somewhat belated defender, and now the American Liberty is following suit.



One of two aeroplanes presented by the Hon. H. Burton from the South African Overseas Club.



FLYING FACTS & THEORIES

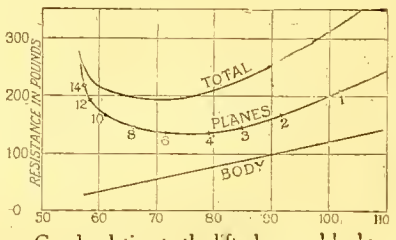
POWER AND RESISTANCE

PART (1)

BY W. G. ASTON, A.F.Ae.S., A.M.I.A.E.

IT is not generally realised that present-day aeroplane designers are able to calculate with extraordinary precision the performances of projected machines long before they are in a state of manufacture. Given such factors as the h.p. curve of the engine, the lift-drag ratio of the plane sections at various angles, the resistance of the body, the surface area, the dimensions of the screw, the weight, etc., they are able to say, within a very small percentage of error, exactly how fast the aeroplane will be near the ground and at different heights, its rate of climb at various altitudes, its gliding angle, stalling speed, and so forth. Some of these results are determined by analogy with the performances of other and similar machines, but others are directly calculable from results which have been obtained by means of models, etc.

Those critics who in the past have been inclined to sneer at the work of the R.A.F., now the R.A.E., at Farnborough are evidently ignorant of the fact that at this institution there has been carried out for some years a most complete series of small scale experiments which are perfectly invaluable to the aeroplane designer because they narrow down his field of conjecture so enormously when he first begins to scheme out a new type. Again, it is infinitely less expensive to make models and have them thoroughly tested than to launch out as the earlier constructors were obliged to do, more or less in the dark, on a full scale proposition.



Graph relating to the lift, drag, and body resistance of aeroplanes.

In this and the following article it is my intention to outline very briefly the manner in which a performance prediction is roughly carried out, and also to deal with the important question of the power required for flight.

The first item that calls for consideration is resistance. This must be considered as consisting of two entirely distinct factors, the drag of the wings and the drag of the body, the latter including struts, wiring, landing gear, radiator, etc. It is necessary so to divide them as each undergoes various changes at a different rate.

First of all, let us consider the drag of the planes. The weight of the aeroplane can be regarded, neglecting the petrol and oil which is consumed in flight, as constant, and the first thing to do, therefore, is to ascertain the various changes in the angle of incidence which are called for by changes in speed in order to provide a constant degree of lift. For this purpose experiments with very accurately made models are conducted in a wind channel, and from these the lift and drag factors at various speeds are determined with the utmost possible precision.

Constant Lift.

Referring to the curve marked "planes" in the accompanying figure, of which the base ordinate relates to speed in feet per second, we see that a constant lift is furnished at a low speed by a big angle of incidence, *e.g.*, 11° at 60ft. per second, and at a high speed by a small angle, *e.g.*, 1¼° at 100ft. per second. Also we see that, whilst the lift throughout the scale is the same, the drag, which is read off in lb. on the vertical at the left, varies

Flying Facts and Theories.—

considerably, having its minimum between 6° and 4° angle, and increasing when this angle is either diminished or enlarged. In other words, the lift-drag ratio of this particular plane is at its best value at about 5°, though it may be quite a different figure with other plane sections.

The lowest curve—approximately a straight line—relates to body resistance. This curve, it will be seen, is of a character quite apart from that of the planes. A considerable proportion of body resistance does not vary at all with change in angle, and therefore its total drag varies more or less constantly with the speed, or, rather, with the square of the speed. Also the effect of the increased slip-stream from the screw is taken into account at low speeds. It need hardly be said that all designers use every endeavour to reduce this body resistance, and the figure is not to be taken to indicate the proportions which characterise a really up-to-date and well-planned aeroplane. They do, however, relate to a perfectly successful type of machine which is now a thing of the past. In this particular case the body resistance may be regarded as high, and it is possible to effect considerable improvement all through the scale. It will be noticed, however, that whilst at low speeds the body resistance is not more than one-sixth that of the wing drag, it becomes more than half of it later on.

In order to get the total resistance of the aeroplane at various speeds the two resistances are added together, and yield the third and uppermost curve in the figure. At 60ft. per second this total drag is, roughly, 210 lb., at 70ft. per second 195 lb., and at 100ft. per second 310 lb. Ordinarily one says that the resistance of an aeroplane, or anything else in motion in a fluid, varies directly as the square of the speed. At first sight one might suppose this curve to indicate a contradictory state of affairs. It must, be realised, however, that in the "speed squared" equation the aeroplane keeps a constant attitude to the air flow, whereas in this case, as required by constant lift for various speeds, it very greatly alters its attitude. It will be seen that with increased speed the change of angle becomes less and less, and consequently the high-speed end of the curve gradually tends to become perfectly regular.

Limit of Resistance.

One very important point should be noted. At about 58ft. per second the resistance of the wings, and with it, of course, the total resistance of the aeroplane, goes up with a rush. This represents the machine's "stalling point," at which the air flow ceases to be uniform and the lifting effect of the upper wing surface is entirely lost. Thus with this particular design 58ft. per second is about the lowest speed at which one can hope to fly the aeroplane, and although the speed is low, it is clear that if it should be reduced even the slightest amount the drag will go up altogether disproportionately.

The curve of total resistance is identical with the curve of the thrust required to sustain the machine at different speeds, this thrust, of course, being directly opposed to the drag.

"AERONAUTICAL INVENTIONS."

How and in What Directions Inventors may best Proceed.

FOLLOWING the recent publication by the Ministry of Munitions of some of the ridiculous schemes submitted to it for improving aircraft defences and other things, and for winning the war, comes a statement from the Air Inventions Committee regarding the directions in which inventors' ability might be concentrated with the most promising outlook of success.

Any radical changes in present-day practice are to be deprecated. There are two objections to them, first, it will take so long for an entirely new idea to be tested out; secondly, if the idea proves a success in the several tests it will have to undergo, it is improbable that it will be able to be placed on a sound marketing basis before somewhere near the end of the war.

The Profit and Loss Account.

The same applies to such details as turnbuckles, clips, etc., which are standardised, and a change in which would only be justified by some very important superiority. Safety devices are another favourite for the inventor, but he should remember that safety in a war machine is a comparatively minor factor, and any safety devices entailing the carrying of much additional weight would have to be extremely good before they could even receive consideration. Probably, even after the most favourable comments they would not be adopted, and would be refused for the very good reason that they involved a greater loss (of speed, etc.) than gain.

Silent Aeroplanes.

Apparently the Air Inventions Board think something might be done some time with regard to obtaining a silent aeroplane. Inventors who think of turning to this question should bear in mind, however, that by far the greater portion of the noise made by an aeroplane emanates not from the engine but from the propeller, while the planes themselves, struts, wires, etc., account for a fair amount. Consequently engine silencing is not the main difficulty to overcome. Many people in a position to judge think that a silent aeroplane never will be an accomplished fact, because any silencing of the propeller must take the direction of enclosing it, and consequently of reducing its efficiency. However, no one is more ready to learn than the average aeroplane designer and engineer, and if someone should come along with something startling he would, without doubt, receive fair consideration.

As was the case with the Ministry of Munitions, the Air Inventions Committee specially requests inventors who know nothing whatever of aviation problems to abstain from efforts to solve them. "Cobbler stick to your last" is a proverb that is still true, war or no war.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

ONE-LEVER CARBURETTERS.

Sir,—I was particularly pleased to see your leader in the issue of July 4th relative to single-lever carburetters. Especially am I interested in your statement on this and previous occasions, to the effect that slightly less power and heavier fuel consumption are derived from the single-lever instrument.

May I say that, while, doubtless, this is the case in many instances, it is not, in my experience (a fairly extensive one), *necessarily* a feature of the automatic carburetter. As an instance, I think that a normal consumption of 90 m.p.g on a 6 h.p. solo machine, and using paraffin fuel, would be considered a good result, even in the case of the non-automatic carburetter. G.H.J

East Molesey.

RICHTHOFEN'S DIARY.

Sir,—"Torque," reviewing "Richthofen's Diary" (*The Motor Cycle*, 27th June, 1918), says: "*The crack German scout, who was recently shot down by a British airman.*" That statement is absolutely untrue, and unfair to the brilliant German. Richthofen was shot down by the Lewis machine gunners of an artillery battery, and I may add that these gunners undoubtedly saved the life of the airman whom Richthofen was on to at the moment. No other planes were within half a mile of the pursuer and the pursued at the time he (the German) met his death. I challenge any airman to say that he shot down Richthofen.

France. R. G. McLEOD (Lieut.)

Sir,—I do not usually rush into print to express my disagreement with anything, but I do not think that Mr. Waddington's letter can be passed over. I do not think that he is fair to Richthofen. He says that Richthofen was a baby-killing Hun. Is this the opinion held of him by our Air Force?

Surely, again, Richthofen's account of his fight with Maj. Hawkes points him out as a sportsman.

Does Mr. Waddington realise also what the last words of "Torque's" article are? I append them: "It is rather a pity that it has been allowed to appear in English without a covering preface pointing out in a downright fashion that the work is, on the whole, a cunning fake." Do these words point out "Torque" as an agent of the "Hidden Hand," or as a pro-German, as Mr. Waddington seems to think?

Winchester. FAIR PLAY.

Sir,—In spite of Mr Waddington, I err in good company in regarding Baron Richthofen as by no means a bad sort. Most of our pilots who survived fights with him spoke of him with genuine admiration, and his name has many times been toasted in our squadron messes. Mr. C. G. Grey, editor of the *Aeroplane*, who prepared the translated diary for publication in this country, is responsible for the suggestion that it is the work of two entirely different persons—the one a brave man, a good sort, and a fine soldier; the other a cunning propagandist, out to hoodwink the German public. I thoroughly endorse this interpretation of the book, and any reader with experience of literary criticism will probably agree with it.

The Baron's fighting tactics were dictated by his superiors, and he cannot be blamed if he avoided taking useless risks. This is a soldier's axiom, and Mr. Waddington will find an identical policy soundly taught in Maj. Bishop's recent book, "Winged Warfare." Moreover, if the literary critics are correct in thinking that the Baron's book was edited, as I described, there is a remarkable similarity between Maj. Bishop's general outlook and the dead Baron's. Capt. Ball was of an entirely distinct type, as a comparison of the three books will show any intelligent reader; but he was not necessarily a better pilot or a better soldier.

I cannot agree with Mr. Waddington that the only good Boche is a dead Boche. I am at present doing all in my power towards sloshing the Hun; but it is folly to abandon oneself so recklessly to wild prejudice that one cannot recognise pluck and sense when one meets it.

The dead Baron was beyond question one of the world's dozen best fighting pilots, a fine soldier, and an exceptionally brave man. If he wrote every word of the "diary" with his own pen, he possessed a personality so curiously mingled as to be incredible—50% frank boyishness and 50% diplomatic guile. If, as is almost certain, at least half of the "diary" is from another hand, he was what the R.F.C. as a corps believe him to have been—a decent fellow who had the misfortune to be born a German. TORQUE.

A POINTED QUESTION.

Sir,—In reply to the letter appearing in your last week's issue, "A Pointed Question," I would inform your readers that the uniform worn by the Auto Cycle Union Motor Messenger Detachment has been duly authorised by the War Office, and is also the uniform of the Royal Automobile Club War Service.

T. W. LOUGHBOROUGH, Director A.C.U. M.M.D.

Sir,—Your correspondent "A Regular Despatch Rider" makes misstatements when he implies that members of the A.C.U. M.M.D. make themselves ludicrous in the eyes of Overseas despatch riders—and the Army at large. Firstly, we obey orders as to uniform. Secondly, it is only jealous eyes that see anything ludicrous. Thirdly, the Army at large (that in France) does not do as he suggests. If "Regular Despatch Rider" will give his full identification (and, of course, he has the pluck), as well as that of the other individuals who pretend to class us as ludicrous. I would make it my duty to convey their sentiments to the War Office authorities, who no doubt would make a move in the matter as to discipline and uniform. We have unfit rejected men, old Army men, men who have played their parts in France in 1914 and 1915, men who have been torpedoed and know the sufferings of ocean exposure, men over fifty, and boys under eighteen. Have all your correspondent's *confrères* done their share? I am perfectly sure that in London they have a very soft job. I may further add that in applying the word ludicrous, or contemptible to the regulation despatch riders of the A.C.U. M.M.D., your correspondent, and the other *few* whom he includes, place themselves in highly aristocratic but objectionable company, viz., that of the Kaiser, who ludicrously classed the British Army as contemptible.

I have no doubt that in time the despatch riders in the regular Army riding in London will be displaced by ladies, who are becoming quite efficient motor cyclists and capable of doing the work, and thus release such as your correspondent, who adopts the title of "Regular Despatch Rider," for more manly work in France. Ultimately, when crocked and discharged, he might endeavour to join the A.C.U. M.M.D. A REGULAR DESPATCH RIDER OF

Hounslow. THE A.C.U. M.M.D., AGED 56.

NUTS AND THREADS.

Sir,—In reply to Capt. D. Kinloch Kirk, surely he does not expect a footrest bolt to withstand battering with a hammer, and I do not think that an Indian footrest bolt would stand such treatment. I am surprised to see that the captain wrestled so long with the nut, knowing that he had so damaged the bolt. Even a novice would not have wasted an hour and a half, seeing the thread was stripped. Had Capt. Kirk taken more pains in putting on the footrest, the damage done to the thread might have been obviated, and the wrestling part of the business not required. The maker of the machine would inform him that the footrest bolt was not put there to be battered with a hammer.

As regards the 8 h.p. combination, £125, what does Capt. Kirk mean by a few pounds over £100 for the Indian outfit (£120)? One with experience on British manufactured combinations and with £100 to invest will not always plump for the American outfit. I have had considerable experience with American motor cycles, but give me the British Trusty Triumph before any of them. S.A.E.

B.E.F.

VARIABLE CAMBER.

Sir,—I read with great interest the article on "Variable Camber and Speed Range," by Mr. W. G. Aston, in your issue for June 20th, and promptly unearthed a drawing of an idea of my own of a variable camber wing that I made in 1911, and which has been submitted in part on two or three occasions to the "powers that be," and each time I was gently but firmly sat upon.

The idea, I remember, was originally intended for a monoplane to obtain lateral stability, dispensing with the use of flaps, and to evade the infringement of the Wright wing warping system which, I believe, was patented about that time.

Having recognised a good thing, I followed it up, and eventually evolved a variable camber wing. The variation proportionally decreases from the root to the tip, preserving the automatic stability of the dihedral angle, with a slight wash out at the wing tips. The attacking edge of the plane from the top to the underneath of the front main spar is of flexible metallic foil, sufficiently stiff to preserve a taut and smooth surface at any variation of camber.

The control is arranged on a pivoted column surmounted by a hand wheel, a backward or forward movement of the column increasing or decreasing the camber in both wings in equal proportion, for quick climbing or flattening out for speed: a slight rotation of the hand wheel causing an increase in camber in one wing and a corresponding decrease in the other, thus securing lateral control. Therefore I go a little further than anticipated in Mr. Aston's article.

The centres of pressure and balance are looked after by a trimming device coupled to the rising and falling column.

Theoretically, I had in 1911 a machine capable of all that Mr. Aston claims for a variable camber: leaving the ground at a low speed, rapidly climbing, and flattening out to attain a very high speed at a lower engine power, also landing safely at a low speed.

For obvious reasons I cannot give any details of the mechanism of either wings or controls, but can confidently say that the contour of the wing would remain taut. The controls would be both positive and instinctive; also be light in operation, as all pressures are balanced. I made several models at the time, each one behaving as successfully as I expected. How the system would function on a full size machine yet remains to be seen.

Having neither cash nor influence, and being duly suppressed, I pigeon-holed my idea for future developments. I have become somewhat rusty of late on matters aeronautic, but would be glad to substantiate my claims to any responsible party who would be competent to utilise the idea.

J. A. BARNETT.

DIFFICULTY IN STARTING.

Sir,—I have been interested in the correspondence upon the 4¼ h.p. B.S.A., which, I consider, is a topping 'bus. I have just had a new one, and found difficulty in getting the engine to fire by means of the kick starter. The other day I happened to fit a Sphinx plug in place of the one that was in, and, lo! the engine never fails to start with the first kick, even when first starting up, and I follow the directions the makers give. Before I put in the above plug I tried the method suggested by one of your correspondents, but failed to make my engine fire.

I think that if the machine is given the little attention that it deserves there is no finer mount.

Alcester. RURAL SURVEYOR.

Sir,—I have just purchased a second-hand Connaught two-stroke, single gear, fixed drive, which is a queer starter. Having tried several times to start by the running mount and with throttle (Amac) about a quarter open, I opened the air to the same extent and gave the engine two squibs with petrol. On running again I got an explosion, and at once mounted, when the machine side-slipped for a long distance, first to the right and then to the left, at goodness knows how many miles per hour. I think I was glad to come to earth, for it flew. As I am new to a two-stroke and a running mount, perhaps a few Connaught riders will oblige with suggestions. The machine is an imp to start. At less than half throttle I never get an explosion; then when I do get it, the machine goes off at racing speed. I am troubled also with the back wheel stopping when I release the decompressor lever. My short legs prevent the sitting and paddling off method. How can I fit a clutch or a gear?

Morecambe. S.O.S.

A scene on the outskirts of Cairo. The pleasant avenues of the city are a welcome relief to D.R.'s after they have ridden miles in the scorching sands of the desert.

MOTION STUDY AND THE MOTOR CYCLE.

Sir,—I have read the article by "Mohandis" in *The Motor Cycle* dated June 6th, and it is certainly interesting, but there is not quite enough of it. I am writing to ask if you would ask "Mohandis" if he would mind sending me the method of plotting the curve for the belt fastener. I am going to try this on some of our Service motor cycles and see what can be got from actual practice. It would no doubt be interesting to obtain curves from several different models, etc., based on actual running conditions.

B.E.F. C. P. PHILLIPS (CPL.)

ROAD CONDITIONS.

Sir,—I notice in your issue of June 20th you draw attention to the 'bus service between Bromley and Westerham Hill. This road has become absolutely atrocious owing to the speed at which the motor 'buses and lorries travel along it. It may almost be said that the road consists of a series of "craters," over which it is positively impossible to travel at a speed exceeding 18 m.p.h., and even then with the most dreadful vibration which plays havoc with my tyres. Surely this road could be kept in somewhat better condition, as in its present state it is practically unrideable.

Harrow. SUFFERER.

MOTOR CYCLISTS AND THE ROYAL AIR FORCE.

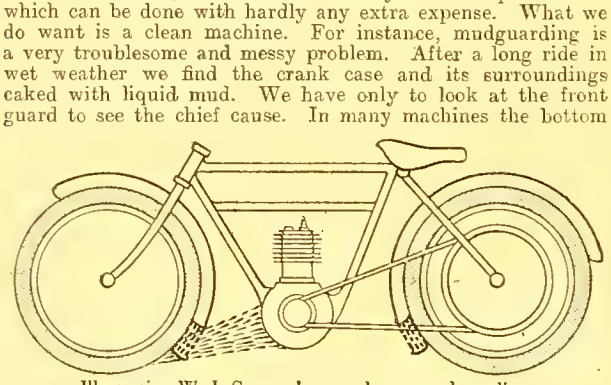
Sir,—Your valuable paper has a wide circulation, and not only is it welcomed by the D.R., but by the M.T. mechanic. In your issue of June 13th, page 573, is a letter by "J.H., B.E.F.," which to us is very humiliating; in fact, I am not sure that there is not a tear in our eye. To say that all D.R.'s in France do all their own repairs, bar frame repairs, is a sweeping assertion, and one wonders if "J.H." has been through all the hundreds of shops here. However, in our experience of six workshops, the M.T. fitter does the complete overhaul, and the D.R. fits the new belt, tyre, plug, and all other wee gadgets.

B.E.F. TWO WORKSHOP M.T. CORPORALS.

MUDGUARDING AND PETROL ECONOMY.

Sir,—Having been a subscriber for many years, may I voice my opinions on the iron horse?

We read of many things that should be incorporated in the post-war machine, which are no doubt very nice and very necessary, but which, unfortunately, help to build up the cost of machines; but there are many detail improvements which can be done with hardly any extra expense. What we do want is a clean machine. For instance, mudguarding is a very troublesome and messy problem. After a long ride in wet weather we find the crank case and its surroundings caked with liquid mud. We have only to look at the front guard to see the chief cause. In many machines the bottom



Illustrating W. J. Stevens's remarks on mudguarding.

of the guard is too high, and as the front wheel revolves the mud just misses the guard and is splashed on the case (as sketch). I think the bottom of the guard could with safety be placed within 3in. of the ground, as whenever the front wheel rises the guard goes with it. Even on modern machines the guard is 5in. or 6in. off the ground.

Now this little alteration would cost nothing, as it is only necessary to bring the guard round a little. This also applies to the back wheel. On some belt-driven machines the guard does not come far enough down on the engine side (see sketch). As the wheel revolves it is continually throwing liquid mud on the bottom part of the belt, much to the detriment of that and the engine pulley. Now, if this were brought well down, lower than the belt, it would help matters very considerably. The alterations are shown by dotted lines.

Now that petrol is so rare and expensive, could not correspondence be started upon the economy of machines? I possess a 1910 2 h.p. Humber lightweight, and I have often ridden in the past motoring days to Southampton from Coventry, and the last journey I made I had a strong wind behind me. I did this journey on half a gallon of petrol—a distance of 116 miles in six hours. Can anybody beat this for economy? I can generally do the journey on threequarters of a gallon, even under adverse conditions.

W. J. STEVENS.

PROPOSED MOTOR TRADE TRAVELLERS' ASSOCIATION.

Sir,—It has long been a matter of intense surprise to me that no effective organisation exists for men engaged in travelling for those firms connected with the motor trade industries.

Some years ago I had the pleasure of establishing a similar organisation in connection with another trade, which rapidly increased in membership and good work and became a tower of strength both to employers and travellers.

Such an association is not a combination to "tilt" at employers, nor would it in any way form a "ring." There are hundreds of motor travellers in the United Kingdom, very few of whom are known to each other, to whom I am persuaded such an association would be of material benefit in various directions. The principles of co-operation are invaluable, and in these days of keen competition friendship and association frequently make co-operative trading a pleasure, for there are a thousand and one ways in which travellers may help each other.

There will be those no doubt whose captious criticism will denounce the proposed scheme, but I am convinced that the vast majority of motor travellers will recognise in the proposal grounds upon which such an association may be formed without incurring much cost and with invaluable potentialities. I would suggest a nominal fee of 5s. per annum, which would be enough to cover cost of management, with meetings in London monthly for business and convivial purposes, and, roughly, the objects might be—

(a) To promote, assist, and defend the interests of the members in trade and commerce.

(b) To take any lawful action the committee, as the governing body, may deem desirable to protect and advance the general trade interests of its members, individually or collectively.

(c) To apply all moneys received from the subscriptions of members of the association, or from any source whatever, to the expenses of management, or to such investments or purposes which the committee, as the governing body of the association, may from time to time *bona-fide* determine as calculated to promote the objects of the association.

(d) To provide a benevolent fund for the relief of any member of the association in necessitous circumstances either by loan or gift, at or without interest.

(e) To provide an accumulative benefit fund for the purpose of providing a fund for the payment of a sum of money on the death of a member, secured by a levy on the subscribers according to the age of each subscriber at the time of joining such fund.

(f) To arrange for the formation of provincial auxiliary committees or branches, and to secure concessions from railway companies and hotels, etc.

(g) To provide for the social enjoyment of the members.

(h) To make arrangements for the insurance of members against loss of life, or accident, or loss by fire or burglary.

(i) To form a guarantee fund for the issuing of fidelity bonds covering any risk of any member.

(j) The doing of all lawful things as are incidental or conducive to the attainment of the above objects.

In connection with the other similar association I formed, we annually held a large concert when the leading firms welcomed their customers, and the proceeds, which were never small, were given to some charitable purpose.

The whole scheme being in its chrysalis state needs careful handling in its initial stages, and I therefore venture to ask the favour of all your readers who are interested in the proposal to communicate with me, and if my experience of over a quarter of a century in organising work would be of any service whatever, I shall be only too proud to give it voluntarily and to the very best of my ability.

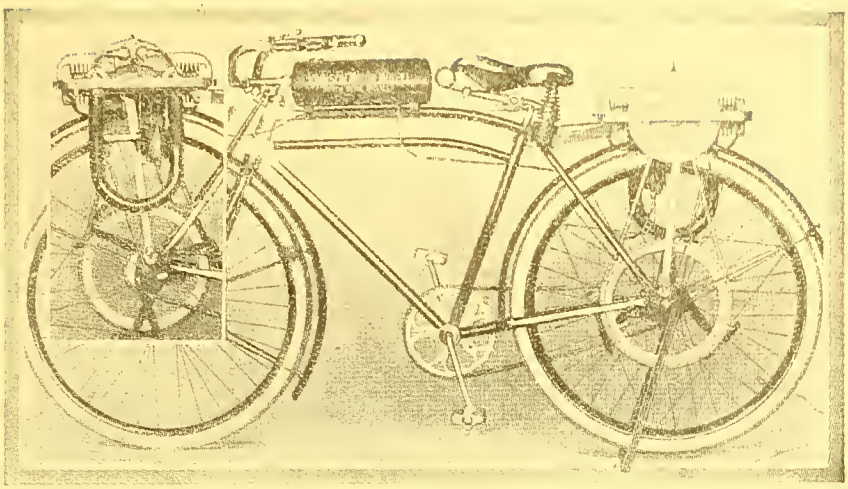
Will all travellers therefore please write to me?

15, Great Titchfield Street, W.1 JAS. V. ABBOTT.

A New American Motor-engined Cycle.

A Two-stroke Flat Twin Engine used as the Power Unit.

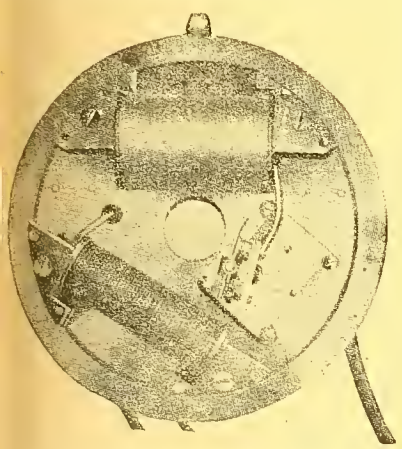
THE latest addition to the list of auxiliary motor plants for attachment to ordinary bicycles emanates from Chicago, and is called the Johnson motor wheel; but although it has satisfied its designers over a two-years' trial, it has not yet been placed on the market.



The Johnson motor wheel. The engine is a flat twin two-stroke of 51 × 38 = 155 c.c., and rated at 1½ h.p.

Engine.

The engine is a two-stroke flat twin of 155 c.c. capacity, having a bore of 51 mm. and stroke of 38 mm., giving approximately 1½ b.h.p. It is carried on an arched support directly over the rear hub, and is further supported by braces from the front cylinder to the rear down tube of the bicycle. The bottom of each cylinder forms half of the vertically divided crank case. The one-piece crankshaft has the cranks set at 180° and, to eliminate the necessity of staggering the cylinders, the bronze connecting rods are cranked, keeping the small end in the centre of the piston. The bearings are bronze bushings of ample size, and on the flywheel side they are divided, with the driving sprocket located between the two parts of the bearing.



Interior of the flywheel, showing the magnet, timing cam, and breaker arm.

Ignition.

The ignition is provided by a flywheel magneto, the only moving parts being the flywheel carrying the permanent magnet and timing cam, and the contact breaker lever operated by the cam. The spark timing is controlled by a lever, which rotates the plate carrying the coil and contact breaker mechanism.

Lighting.

An unusual feature is the provision of current for lighting purposes by another coil inside the flywheel operating in connection with the flywheel magneto, yet independent of the ignition mechanism.

Carburetter.

The carburetter, which is specially designed for this engine, is of a simple float feed type, and is attached to the off side of the motor within the U-shaped combination exhaust manifold and silencer. A jacket is attached to the exhaust pipe to supply hot air to the carburetter.

Lubrication is on the petroil system, and the oil is mixed with the petrol carried in the three-quart tank attached to the top tube. The petrol consumption works out at 190 miles to the gallon, which is reasonable.

As the weight of the engine is carried centrally over the rear wheel, the balance of the bicycle is not unduly affected. In the experimental model, an extra heavy rear wheel is fitted to take 1¼in. or 1⅜in. tyres. The driving chain sprocket is attached to the wheel by six heavy-gauge rods, which take the drive (in either direction) through coil springs fitted on their ends attached to the sprocket.

Altogether the appearance of the machine is attractive, though possibly approaching the limit at which it could still retain the title of "attachment."

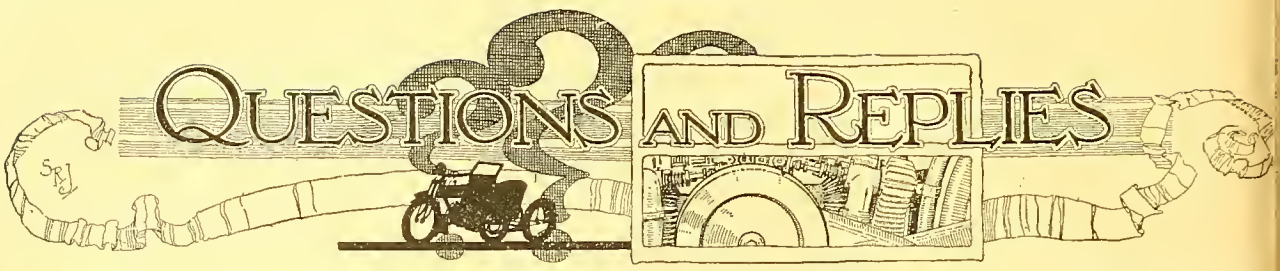
A.G.M. OF THE AUTOMOBILE ASSOCIATION AND MOTOR UNION.

THE annual general meeting of the Automobile Association and Motor Union was held in the White Room, Savoy Hotel, on Wednesday, the 10th inst., at noon. Mr. W. Joynson-Hicks, M.P., was in the chair.

The Chairman pointed out that this was the fourth meeting which had been held under war conditions, and referred to the excellent record of the Automobile Association and Motor Union during the war. It was a matter of wonder to him that the Association had kept going during these troublous times, and that, at every committee meeting, a number of new members and some life members had been elected. This, he pointed out, showed the confidence the motoring community had in the Association. The Association, he said, had built up a large reserve, which had now reached such a figure that when the war is over no voluntary organisation looking after automobilists would be in so healthy a financial position as the A.A. and M.U.

Mr. Joynson-Hicks then went on to refer to the conditions of the roads, which had been spoilt during the war. Before hostilities began, no roads were equal to those in England, but when the war was over the Automobile Association would be the first to see that the roads were taken in hand and repaired, and also that the money derived from the taxation of motorists, which had been employed to swell the funds of the Road Board, would be redevoted to its original purpose. The sum of £5,000 had been devoted to signposting the roads of the United Kingdom. That sum was almost intact, so that at the first opportunity there would be a recrudescence of the A.A. and M.U.'s old policy. As regards the fuel question, he pointed out that before the war petrol was in the hands of a monopoly. They were trying to encourage a rival fuel. He believed in benzole, and the Petrol Executive was doing all in its power in that direction to encourage this fuel, and he hoped that the Government, as it has controlled motoring during the war, would also control the fuel monopoly after the war.

Turning to the luxury tax, he said that such a tax was undoubtedly justifiable during war, but he questioned whether a motor car could be called a luxury, unless it were one costing £2,000. The use of a motor car as used to-day was not a luxury, but a national service. In the ten years in which he had been chairman, he did not remember any report in which he had greater confidence than that which he was putting before the members. The vitality of the Association was greater than ever.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Carburetter Flooding.

I should be very much obliged if you could tell me what is wrong with my carburetter. (I do not know the make, as there is no name on it, but it is attached to a 1914 Hobart.) The petrol will flow from it on merely turning on the tap underneath the tank, and without touching the needle to flood in the usual way.—T.B.

The carburetter is probably an Amac, and the trouble may be due to the needle valve sticking. Evidently it is not seating properly, otherwise it would shut off the supply as soon as the float chamber was full. It is also possible that the float may be punctured.

Trade Numbers.

Would you kindly let me know if it is possible to get petrol and permission to test motor cycles that have been overhauled to sell? I cannot show them at work on the road. Could I get a trade number to cover them all, and what would be the cost?—R.W.

The only way to get the petrol will be to place the full details of your claim before the Petrol Controller, 19, Berkeley Street, London, W.1. To obtain trade numbers you should apply to the local registration authority. It is very improbable that you will be able to obtain trade numbers; but you do not say what your occupation is, and the granting of trade numbers depends entirely upon this.

Taking a Machine to Australia.

I am going out to Australia shortly, and wonder whether: (1.) It is possible to take a sidecar combination with me as passenger's luggage under present circumstances? (2.) Whether it would be cheaper to buy a machine out there? (3.) Cost of carriage? (4.) Possibilities of selling and probable price out there of a combination that has cost £160 here? (5.) Would it have to be crated whole or dismantled? (6.) Landing fees for such a machine? —H.B.

(1, 2, and 3.) As the shipping conditions vary so much from time to time, the best course for you to adopt would be to apply to a firm of shippers, such as Messrs. Davies, Turner, and Co., Ltd., 52, Lime Street, London, E.C.3, or to the steamship line by which you intend to take passage, repeating to them the questions contained in your letter to us. (4.) This is largely one of opinion, but from information at our disposal we should imagine you would have considerable difficulty in obtaining anything like a satisfactory price for a machine that has cost £160. (5 and 6.) The shippers would answer these queries. There are reduced duty fees for second-hand machines and those of British origin.

"Tricky" Repair Work.

I am writing to ask your advice regarding a Morgan Runabout I bought second-hand with both water jackets cracked by the frost. I took the machine to a local dealer for repairs. He informed me that I should require a permit from the Ministry of Munitions for new cylinders. After a short time I managed to get the necessary permit from the Ministry, and took it to the dealer mentioned. On taking delivery I noticed water still leaking from one cylinder, and he informed me it was on account of the newness, and that it would rust up in the course of time. I called on the dealer at different times and told him it was no better. On the second day of delivery I asked him if they were new cylinders, and he was quite annoyed. I told him I took his word that they were new, but the other day I had my suspicions, so I scraped the enamel off from where the water leaked, and saw a piece of brass brazed in for a distance of 3in. on each side of the plug in front of one cylinder, so shortly afterwards I called on the repairer again, and told him that the cylinders were not new, but he still insisted that they were. Is it customary for the engine people to turn out repaired cylinders as new? I may state that when I went to see if the machine was ready the repairer informed me that it required a new induction pipe; but I have my doubts about this being new, as it is all fastened together with asbestos string and insulation tape. It is quite a slack fit; I can shake the pipe about with my hand.—S.S.

You should write to the makers of the engine, placing the circumstances of the case before them, and asking their opinion. It certainly appears to us as if the cylinders fitted were not new; but, of course, it is rather difficult to say definitely without seeing them. The makers would certainly be able to tell you if they have recently supplied new cylinders to your repairer. We assume you are quite sure that the cylinders now fitted are not your old ones repaired. If the makers' reply appears to support this opinion, inform the repairer that you will put the matter in the hands of a solicitor unless he gives you satisfaction.

Attaching a Sidecar.

Will you kindly answer following regarding a Bat- V twin with overhead valv (1.) What horse-power is an ov head V twin, 85 mm. bore 65 mm. stroke? (2.) Would the fra and machine be safe to attach a li Montgomery torpedo sidecar? (Would the engine be suitable, a what gear ratio should I use? (How many miles to the gallon sho the machine do? (5.) Can I unused petrol on a sick leave licen after my licence has expired?—H.W. (1.) The nominal h.p. is 5-6. (2.) Y (3.) About 5 to 1. (4.) About six (5.) Only for the purposes allowed the last Coal Gas and Petrol Order.

Running on Paraffin.

I have a Scott, which I wi to run on paraffin. Would y kindly tell me (1) what alte tions are necessary for starti with petrol (the carburetter is Binks), (2) what alterations are nec sary to obtain good running, and would the machine be harmed in a way, *e.g.*, as regards bearings.—B.F. (1.) You require an auxiliary tan which should be connected by means a T union to the petrol pipe. Turn the petrol when you desire to start, a when the engine is once warm turn t off and turn on the paraffin. (2.) B sides the alteration mentioned, it will necessary to have the air to the carb retter adequately warmed. (3.) Not the vaporisation is good.

RECOMMENDED ROUTES.

STOCKTON TO WORKINGTON.—J.L.

Stockton, Darlington, Pierce Bridg Gainsford, Barnard Castle, Bowe Brough, Appleby, Penrith, Keswic Cockermouth, Workington.

COVENTRY TO RHYL.—J.H.H.

Coventry, Fillongley, Nether Whitacr Watling Street, Weeford, Lichfield, Rug ley, Weston, Stone, Pipe Gate, Woor Nantwich, Tarporley, Chester, Hawa den, Holywell, Rhyl.

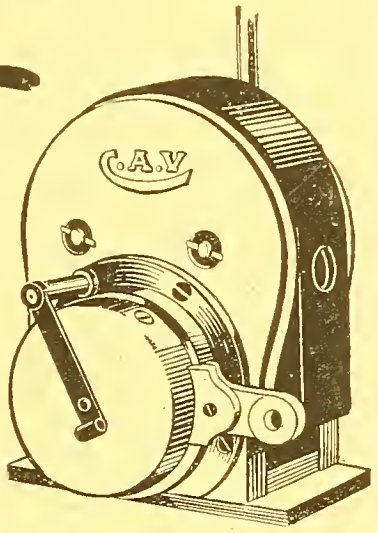
HALIFAX TO ABERDEEN (VIA AIRDRIE).—A.C.T.

Halifax, Bradford, Harrogate, Ripo Northallerton, Darlington, Durha Newcastle, Otterburn, Carterbar, H wick, Selkirk, Galashiels, Airdrie, Denn Stirling, Peebles, Biggar, Lanark, Ne mains, Auchterarder, Perth, Coup Angus, Glamis, Forfar, Laurencekir Stonehaven, Aberdeen.

Trustworthy Service

The C.A.V. MAGNETO is now undergoing the severest test of all—ACTIVE SERVICE—Proving daily its splendid reliability in all climates and under all conditions . .

C.A.V. Magnetos
BRITISH THROUGHOUT



C. A. VANDERVELL & CO., LTD.,
Electrical Engineers :: ACTON, LONDON, W.3
Members of the British Ignition Apparatus Assn.

On the far-flung battle front, where the destinies of the Empire are being decided, the

ZENITH

Gradua Gear Motor Cycle

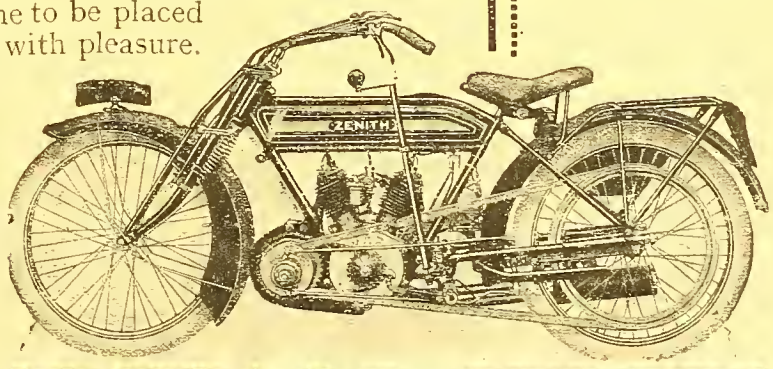
is constantly performing miracles of endurance. Built for strength and speed, this wonderful machine is hourly justifying its choice for important Government work.

We invite you to send your name to be placed on the waiting list. Catalogue with pleasure.

WRITE
ZENITH MOTORS, LTD.
HAMPTON COURT, ENGLAND.

TRADE MARK REGISTERED ZENITH MOTORS LTD HAMPTON COURT ENG

THE HALLMARK OF EFFICIENCY



Owing to National circumstances it is impossible to deliver to private riders, but we can supply machines for National Service where the buyer's claim is recognised by the Ministry of Munitions and a permit granted

Models from 3½ to 8 h.p.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ——— & Co. ILIFFE & SONS Ltd., and crossed ———

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4987

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

A.J.S 1915 6h.p Combination, hood, screen, and accessories; £79/10.—Motor Exchange, Horton St., Halifax. [6708

A.J.S, 1916 6h.p. Combination, Lucas dynamo and lamps, spring seat, spare wheel, very smart; £97/10.—Farrar.

A.J.S. 1915 6h.p. Combination, spare wheel, Lucas lamps, Cowey speedometer, extra smart; £87/10.—Farrar.

A.J.S. 6h.p. Combinations.—We have five in stock. If you wish to buy, sell, or exchange your A.J.S., write us.—Farrar's Motors, Hopwood Lane, Halifax. [6124

A.J.S.—Immediate delivery of Military Model, 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

A.J.S., late 1913 6h.p. combination, good condition, Swan S.C., spare covers and tubes, luggage grid; £45; owner bought car.—Boyce, 27, Turnpike Lane, Hornsey. [6748

A.J.S., 1913-14, 2¾h.p., 2-speed, C.S. clutch, £35; 1914 3-speed and kick-starter, £42/10; 1914 6h.p. combination, £67/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [6620

Forward Facts No. 4.

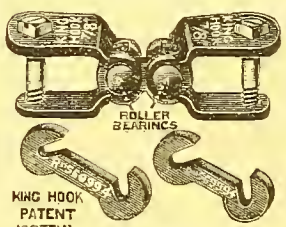
The Chain is only as strong as its weakest link — the Belt as its fastener.

If you realise that fact you will choose only the

FORWARD

every time because its strength is exceptional.
It has been kept so by our determination not to diminish efficiency for the sake of price. The figure at which it is sold has not been unreasonably reduced to meet other unreasonable prices.
WE depend on Quality!
Ask for details.

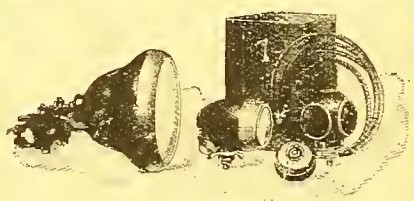
FORWARD MOTOR CO.,
Forward Works, Summer Row,
BIRMINGHAM.



The King Hook 1/-, adjustable 1/3 each.

1556

F.R.S. ELECTRIC



Sidecar sets, complete, as above	153/-
Motor Cycle sets, with accumulator in box, for fitting to top tube ..	100/-
Lamps only, with handlebar fittings	45/6

F.R.S. LAMPS, "Beam" Works, Pershore Street, BIRMINGHAM.

ROSCO CYLINDER BLACK.
PRESERVES YOUR CYLINDERS.
Tins, 6d. Withstands Heat. Post Free, 8½d.
Tins, 1/- Post Free, 1/3½
Sole Manufacturers:
OWEN BROS., HULL, Eng.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Motor Cycles.—Immediate delivery of Milit model, complete, detachable wheels, 700×80 ty £91/6; no permits required.—P. J. Evans, sole ag for Birmingham and district, 87-91, John Bright Birmingham. [62

A.J.S. 6h.p. Combination, late 1913, 3-speed, change, 3 lamps, 2 horns, speedometer, all ac sories, been thoroughly overhauled, enamelled; 60 gn Apply after 8 or week-ends, Blythe, 117, Tufnell P Rd., Holloway, N.7. [X6

3h.p. Twin Engine A.J.S. Combination, 1916 mo detachable wheels, special engine, countershaft speed gear, all-chain drive transmission, handle-bar c trolled clutch and kick-starter, Lucas head and lamp, side lamp, hood and screen, speedometer, lamp, beautifully upholstered; price 90 gns.; guar teed.—Wauchope's, 9, Shoe Lane, London. [68

Ariel.

CROW Bros., Guildford, Ariel agents.—New and o hauled second-hand models in stock. [5

3½h.p. Ariel Combination, latest improvemen countershaft 3-speed gear, free engine and ki starter, includes several spares and accessories, a speedometer; £65; guaranteed.—Wauchope's, 9, Sh Lane, London. [68

A.S.L.

A.S.L., 3½h.p. J.A.P., Grade gear, Bosch ma £14/10.—Motor Exchange, Horton St., Halifa [67

Auto-Wheels.

AUTO-WHEEL, Wall, recently overhauled; £7 Rogers, 42, Church Rd., Hendon. [68

AUTO Motor, 3½h.p., Bosch mag., good tyres; £7/10 Collier's Motories, Deal St., Halifax. [67

AUTO-WHEEL and Cycle, excellent condition; £ take lady's 3-speed cycle part exchange.—Garda Berwyn, Marsh Rd., Pinner. [67

Bat.

BAT, 6h.p., 1915 or 1916 model, 2-speed, J.A.P. twi cyl. engine, countershaft gear, includes accessorie £45; guaranteed.—Wauchope's, 9, Shoe Lane, London [68

BAT-J.A.P., 1914, 6h.p., countershaft 3-speed ge clutch, kick starter, Bosch waterproof mag., coac built sidecar, hood, wind screen, grey finish throughou 3 lamps, horn, good condition; £45.—The Premier Mot Co., Aston Rd., Birmingham. [67

Bradbury.

1913 Bradbury, 3½h.p., 3-speed Armstrong, ne Dunlops, just overhauled; £25.—Mitcham, Littl port. [66

1914 Bradbury, 4h.p., 3-speed, cane sidecar, go tyres, and accessories; £55.—Jones, Garag Droitwich. [X62

BRADBURY, 1914, 6h.p., and sidecar, £55; 191 1913 3½h.p., 3 speeds, with coach sidecar, £32/10 1913 3½h.p. 3-speed model, £29/10.—Collier's Motorie Deal St., Halifax. [67

BRADBURY, 1912, 4h.p., N.S.U. 2-speed gear, fr engine, good tyres and tubes, full lighting se plating and enamel good; any trial; offers wanted.— Tilbury, West Horsley, near Leatherhead. [68

Brown.

BROWN, fitted 1915 overhead valve, 4-5h.p., twi clutch, F.E.; £18/10.—13, Bendon Valley, Wand worth. [67

MOTOR CYCLES FOR SALE.

B.S.A.

B.S.A., 1914 clutch model, condition as new, new tyres, belt, etc., with brand new Phœnix sidecar; bargain; owner joining up.—Holvoet, 5, Loudoun Rd. Mews, Hampstead. [6693

1916 B.S.A., 3-speed, black enamel, gold lining, luxurious undersiung sidecar, lamps, new condition, exceptionally smart; £65, offers; exchange.—24, Beauval Rd., East Dulwich. [6805

1915 B.S.A., 4½h.p., all chain drive, and luxurious coachbuilt sidecar, Lucas dynamo lighting, speedometer; £70.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

B.S.A. 4½h.p. Combination, 1915, chain-cum-belt, 3-speed countershaft, kick start, free engine, accessories, spares; any trial; £50, no offers.—W. Bartley, Hightown, Congleton, Cheshire. [6776

1917 B.S.A., 4½h.p. model, all-chain drive transmission, 3-speed countershaft gear, kick-starter and free engine, all accessories included; £67/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [6855

B.S.A. 1916 4½h.p. 3-speed Combination, C.A.V. electric lighting, Klaxon horn (chain-cum-belt model), new tyres all round, perfect condition throughout; great bargain, £55.—46, Hillcrest Rd., Acton. 'Phone: 1578 Chiswick. [6751

4¼h.p. Countershaft B.S.A., all chain drive, and disc wheels, condition as new, £50; exchange for 3½h.p. countershaft Rover, cash adjustment either way; B.S.A. 4½h.p. cylinder, perfect, price £1.—9, Osborne St., Barrow-in-Furness. [X6256

Calthorpe.

URGENT Sale.—Calthorpe-Jap, Enfield gear; £18.—24, Beauval Rd., East Dulwich. [6806

1916 Calthorpe, 2-stroke, lamps and horn; £30.—Parker and Son, St. Ives, Hunts. [6749

2½h.p. Calthorpe 2-stroke, 1915 model, 2-speed gear; £22/10.—Wauchope's, 9, Shoe Lane, London. [6856

CALTHORPE Lightweight, 2½h.p. J.A.P., 2-speed gear; £24.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3523

CALTHORPE Junior, 2h.p., 2-speed, very little used, but requires slight adjustment; £9.—98, Tulse Hill, S.W.2. [6777

CALTHORPE-J.A.P., 2-stroke, 2¾h.p., 2-speed, free engine, new this year; £30.—H. W. Cade, 26, Brondesbury Rd., Kilburn. [6762

CALTHORPE-J.A.P., 2¾h.p., 4-stroke, Enfield 2-speed, F.E., scarcely soiled; can be tested at minute's notice.—S.W.R., Box 2,098, c/o *The Motor Cycle*. [X6221

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [6371

Campion.

2½h.p. 1916 Campion-Jap, 2 speeds, lightweight; £17/10.—Palmer's Garage, Tooting. [6797

Clyno.

6h.p. Clyno Coachbuilt Combination, 2 cyls., 2 speeds, overhauled; £30.—Palmer's Garage, Tooting. [6794

Connaught.

CONNAUGHT, 2¾h.p., 2-stroke, 2-speed, T.T. model, new Dunlops, fast, cheap to run; £20.—Deane, Matlock Bath, Derbyshire. [X6239

Diamond.

DIAMOND, 2¾h.p., 2-speed, 2-stroke, extra good; £25/10.—Motor Exchange, Horton St., Halifax. [6712

Douglas.

3½h.p. 1914 Douglas, 2-speed model; £45.—Wauchope's, 9, Shoe Lane, London. [6857

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749

1914 4h.p. Douglas and Sidecar, almost as new, complete; £68.—Longney, 33, Ferrers Rd., Oswestry. [6691

1915-16 4h.p. Douglas Combination, little used, Palmer cords, as new; £50.—Frankton, 52, Ribble Rd., Coventry. [X6284

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

1915 2¾h.p. Douglas, 2-speed, Colonial model, extremely smart and fast; reasonable offer.—Lord, Mountfield, Prestwich. [X6251

DOUGLAS, 1914, 2¾h.p., T.T. model, excellent condition, nearly new tyres, lamps; 35 gns.—Rogers, 12, Church Rd., Hendon. [6834

DOUGLAS Motor Cycles.—We can supply by return 1918 models on receipt of permit.—Eli Clark, the Douglas agent, 196, Cheltenham Rd., Bristol. [0923

DOUGLAS, 2¾h.p., 1913-14, 2-speed, clutch, kick start, special steel pistons, new back tyre, lamps, 40 m.p.g., fast; £32.—Shelley 76, Victoria Rd., Harlesden, N.W.10. [6743

4h.p. Douglas, 1916-17, Model B., 3-speed, clutch, etc., and coachbuilt sidecar, fully equipped, lamps, speedometer, warning signal, tools, spares, etc., T.T. cars, long exhaust, outfit in splendid condition, hardly used past 18 months; any trial; £70, bargain; take good make typewriter part.—A.E., 23, Market Place, Kingston, S.W. [6804

LAMB'S

PLENTY OF LADIES' CYCLES IN STOCK AT LOWEST PRICES

NEW MACHINES.

HUMBER, 23in., only soled £14 14
TRIUMPH, lady's, only soled ..... —
CLINCHER, road racer, new £10 10
CALTHORPE CO.'S gent's roadster, 2 or 3-sp., Dunlop tyres, gear cases, 22in., 24in., or 26in.
CALTHORPE CO.'S lady's, 2 or 3-sp. gear, Dunlop tyres, 20in., 22in., or 24in.
ARIEL, lady's Standard, 20in., 22in., 24in.
ARIEL, gent's Standard, 22in., 24in., 26in.
NEW HUDSON, gent's Royal Roadster, 21in., 23in. 25in.
NEW HUDSON, lady's Standard.
NEW HUDSON, gent's Standard.
NEW HUDSON, lady's Royal.
RALEIGH, Model E, racer.
RALEIGH, 24in., Dunlop tyres, oil bath.
ARIEL, R.R., 24in. and 26in.
SPARKBROOK, grand lightweight, chocolate finish, 26in.
VINDEX, roadster, gent's, 26in. £12 12
FARADAY, 22in. frame £10 10

SECOND-HAND MACHINES.

Tradesman's, 22in., serviceable order £8 8
RALEIGH, racer, 25in., like new £10 0
COVENTRY, lady's, 23in. £7 15
SUN, roadster, gent's £10 10
ARIEL, juvenile, 20in. £6 6
1 gent's **Tricycle,** 24in. frame, with box .. 12 gns.
Cycle, Sidecar for child £5 10
Box Carrier £12 12
ARIEL, gent's, 22in., R.R. £5 15
1 **RUDGE** Crescent Racer, 26in. £7 15
ROVER, R., 26in. £6 6
NEW HUDSON, 24in., roadster, 3-speed . £7 10
Juvenile, roadster, 20in. £5 0
ARIEL, tradesman's £9 15
Racer, 24in. £5 10
Racer, 22in. frame £4 10
MAGNET, R.R. £5 15

LADIES' MACHINES.

Our Own Model, as new £9 9
TRIUMPH lady-back Tandem, 23in. back, 25in. front, loop top tube, as new .... 18 gns.
And many others.

WANTED—High-grade Cycles.

High prices paid. No bargaining. Cash on sight. Proof ownership essential.

50 MOTOR CYCLES IN STOCK.
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(Only Depôt in this district.)
Hours 9 to 8. **Thursdays 1 p.m.**

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS.—New 1918 models supplied to doctors, farmers, etc., against Ministry of Munitions permit. 1913 2-speed Douglas, £29/10; 1914 2-speed model, £34/10.—Motor Exchange, Horton St., Halifax. [6715

DOUGLAS, 1915, 4h.p., 3 speeds and kick starter, just overhauled, all accessories, including speedometer, £58, or complete with coachbuilt sidecar and screen, £65.—Maudes', 100, Gt. Portland St., London, W.1. [6823

1918 2¾h.p. Douglas Motor Bicycles, brand new, for immediate delivery, models W clutch, U touring, V T.T., against Priority Permit only. Write for particulars how and where to obtain one.—Douglas Specialists, Robinson's Garage, Green St., Cambridge. [6807

Enfield.

6h.p. Enfield Combination, 1916 model, in good order throughout; £80.—Robbins, Garage, Rugby. [X6207

ENFIELD 1916 Combination, like new; £62/10.—51, Maplethorpe Rd., Thornton Heath, S.E. [6686

1916 (late) Enfield Combination, 6h.p., horn, screen, very good condition throughout; £75.—Below.

1915 Enfield, 3h.p., 2-speed, lamps, horn, perfect machine; £32.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

ENFIELD 1917 6h.p. Combination, Lucas lamps and horn, good tyres; £85.—Jones, Garage, Droitwich. [X6255

ENFIELD 3h.p. Twin, 66 gns.; touring and T.T. models in stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3522

ENFIELD 1915 6h.p. Combination, £75; 1916 ditto, £84; E.P. or exchange.—Service Co., 292, High Holborn, London. [6626

LATE 1915 3h.p. Enfield, £36; gent's cycle or furniture taken in part exchange.—Witcombe, 89, Macoma Rd., Plumstead Common. [6737

ENFIELD, 1915, 6h.p., 2-speed coach combination, in fine order, £72/10; 1916 model, £82/10.—Collier's Motories, Deal St., Halifax. [6714

1917 Royal Enfield Combination, all accessories and speedometer, nice smart condition, and carries our guarantee of mechanical fitness; £90.—Wauchope's, 9, Shoe Lane, London. [6858

ROYAL Enfield Combination, coachbuilt sidecar, price £45; also a 1914 model, £55; and a 1916 model, £87/10, complete with all accessories and guaranteed.—Wauchope's, 9, Shoe Lane, London. [6839

LATE 1915 Enfield Combination, 2,000 miles, not been used 18 months, new front and back tyres, hood, wind screen, horn, etc., just been overhauled, perfect condition; joining up.—Bran, 20, Farlton Rd., Garrett Lane, Earlsfield. (After 6 o'clock.) £75. [6800

ABSOLUTELY It.—Late 1915 T.T. 3h.p. Enfield, picked engine, fastest Enfield on road, terrific acceleration, long exhaust, F.R.S. lamp, appearance almost new; 35 gns., worth storing.—Cox, 120, Marlborough Flats, Walton St., Chelsea, S.W.3. Tel.: Regent 2064. [6689

ENFIELDS.—We are offering several Enfields, all in good guaranteed condition: 1916 6h.p. combination, standard 2-speed model, with all accessories, including spring handle-bars, mechanical horn, etc., £78; another, 1915-16 standard outfit, but guaranteed not to have done 1,000 miles, and like new, £75; also 1917 model due in this week, complete with about £15 worth of accessories; also a 1917-18 2-speed 2-stroke, not done 250 miles, £40.—Maudes', 100, Gt. Portland St., London, W.1. [6826

F.N.

F.N., 1914, 4-cyl., 6-8h.p., overhauled F.N. works April last, large head light, rear light, Klaxon horn, all accessories; owner going abroad.—Cade, 26, Brondesbury Rd., Kilburn. [6761

Harley-Davidson.

HARLEY-DAVIDSON, 7-9h.p., with sidecar, nearly new; seen any time; £30.—10, Semley Place, Victoria, S.W. [6700

HARLEY-DAVIDSON 1915 7-9h.p. Combination, electric; £65; E.P. or exchange.—Service Co., 292, High Holborn, London. [6627

HARLEY-DAVIDSON, 1916, with Harley sidecar and accessories, £82/10; 1915 combination, £69/15.—Motor Exchange, Horton St., Halifax. [6716

1917 Harley-Davidson Combination, 7-9h.p., lamps, horn, good condition; bargain, £105.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

HARLEY-DAVIDSON, genuine 1917 model, with dynamo lighting, Millford sidecar, speedometer, and all accessories, ready for the road, fully guaranteed; £115.—Maudes', 100, Gt. Portland St., London, W.1. [6827

Hazlewood.

HAZLEWOOD 6h.p. Combination, 3-speed, countershaft, speedometer, lamps, accessories, new tyres, just overhauled; £60.—28, Vernon Rd., Copnor, Portsmouth. [X6242

Henderson.

HENDERSON, 1914, 4-cyl., perfect running order; cash £65, or £45 cash and useful exchange; seen evenings.—Howard Wilson, 33, Acre Lane, Brixton, S.W. [6332

1915 Henderson, 4-cyl. model, speed gear and clutch, nice condition and running order, original tyres; sold with accessories complete, £70; property of an officer.—Wauchope's, 9, Shoe Lane, London. [6840

MOTOR CYCLES FOR SALE.

Henderson.

HENDERSON, with Henderson sidecar, new 1916, only run fine week-ends, lamps, spares, etc.; £86.—Alex Dickins, Lime Av., Huthwaite, Mansfield. [X6231

Hobart.

1917 Hobart-Villiers, single speed, new condition; £18/10, offer.—155, Pershore Rd., Selly Park, Birmingham. [6687

Humber.

HUMBER, 3½h.p., vertical engine, mag., spring forks; £13/10.—Motor Exchange, Horton St., Halifax. [6715

Indian.

1915 5h.p. Red Indian, T.T model, 3-speed, clutch; £38.—Railway Garage, Staines. [5771

INDIAN, 7-9h.p., free engine, twin, £23/10; 4h.p., 2 speeds, £22/10; 1914 7-9h.p., 2 speeds, spring frame, Millford sidecar, £49/10.—Collier's Motories, Deal St., Halifax. [6717

RED Indian, genuine 1915 twin, mag., 3 speeds, clutch; great bargain, 35 gns.; first come first served.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [6784

INDIAN, 7-9h.p., 1914, 2-speed gear model, and spring frame, semi T.T. bars, fast machine, mechanically sound, speedy; unprecedented opportunity; price £35.—Wauchope's, 9, Shoe Lane, London. [6843

7-9h.p. Indian, T.T. clutch model, in excellent condition, speedometer, Palmer cord tyres; 30 gns., or exchange sidecar combination of good make.—E. Phillips, 379, Wandsworth Rd., London, S.W.8. [6702

1916 5h.p. Indian Combination, Swan sporting sidecar, 3 speeds, clutch, kick starter, speedometer, lamps, and accessories; £40; seen by appointment.—Colson, 41, Stile Hall Gardens, Chiswick. [6705

7-9h.p. Indian, 1914, with Millford sidecar, 2-speed, free engine, spring frame, dynamo lighting, electric starter, horn, speedometer, new tyres, suit, lot of spares, condition as new, guaranteed; nearest £75.—Jennings, Inkerman House, Hamworthy, Poole. [6759

INDIAN 1915-16 5-6h.p. Combination, torpedo sidecar, very powerful, 3-speed, clutch, kick start, electric lighting, speedometer, mechanical horn, tyres nupuoctured, one new spare Dunlop, as good as new, having been stored since February, 1917; £80, or very near offer.—259, Putney Bridge Rd., Putney. [6742

Ixion.

IXION, 2-stroke, single gear, late 1916, Villiers engine, Sensprav, E.I.C., good condition; sacrifice £20.—Dr. Malpas, Boscombe. [X6196

James.

JAMES 1916 4¼h.p. Combination, Lucas dynamo lighting, £75/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [6622

Kerry.

3½h.p. Kerry-Abingdon, low-built, handy reliable machine; £10.—Palmer's Garage, Tooting. [6795

Lea-Francis.

1916 Lea-Francis, free engine, 2 speeds, kick starter, and coachbuilt sidecar, guaranteed sound, and perfect order, first-class condition; £30, lowest.—Box 2,106, c/o *The Motor Cycle*. [X6260

LEA-FRANCIS (late model) Coachbuilt Combination, twin J.A.P., enclosed Bosch, 2 speeds, countershaft, kick, enclosed chain drive, lamps; only 39 gns.; exchanges.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [6785

Levis.

LEVIS, 1914, running, new Dunlops, Amac, etc.; £14.—Elleman, Battestree. [X6217

1915 Levis, 2-speed, 2-stroke, E.I.C. mag., lamps, etc.; 20 gns.—73, Falkland Rd., Hornsey, N.8. [6803

LEVIS, latest type, 2 speeds, 2-stroke model; immediate delivery for work of National importance; £47/10.—Maudes', 100, Gt. Portland St., London, W.1. [6110

Lincoln-Elk.

LINCOLN-ELK, 1914, 6h.p., countershaft gear, underslung coach sidecar; £45.—Motor Exchange, Horton St., Halifax. [6718

Matchless.

W.O. Matchless 8h.p. J.A.P. Combination, spare wheel, guaranteed indistinguishable from new, only ridden 10 miles; bargain, £115.—Below.

1915 Matchless Combination, 8h.p. M.A.G., Lucas dynamo lighting, speedometer, horn, good condition throughout; £90.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [6551

8h.p. Matchless Combination, Paris de Luxe sidecar, hood, and screen, with all accessories, perfect; sacrifice.—Lydford, Long Sutton, Langport, Som. [6747

MATCHLESS New 8h.p. War Model Combination, £125; second-hand combination, £70; E.P. or exchange.—Service Co., 292, High Holborn, London. [6628

MATCHLESS, 1914 special model, round tank, T.T., 6h.p. J.A.P., Amac, Bosch weatherproof, Villiers free engine hub, kick start, new tyres, 26×2½, tubes new, speedometer, lamps, horn, and tools, machine in splendid tune, and as new; 40 gns.—D. Hare, Ormesby, S.O., Yorkshire. [X6218

SPECIAL OFFER THIS WEEK

ROVER, 3-speed, clutch and kick-starter, purchased new June, 1917. Not ridden six months. Mileage 2,000. Makers' list price to-day, £80. Our price ..... **50 gns. only.**
A saving of nearly £28.

Also the following New Machines, latest models, in stock, all of which can be supplied without permits.

NEW IMPERIAL-J.A.P., 2¾ h.p., 2-speed ..... 44 gns.
LEVIS POPULAR, 2-stroke £32 0
LEVIS, 2½ h.p., 2-speed, 2-stroke.. £47 10
LEVIS, 2½ h.p., 2-stroke..... 35 gns.
ROVER, W.O., 5-6 h.p. J.A.P., and Sidecar £124 5
ROVER, W.O., 5-6 h.p. J.A.P., 3-speed, kick-starter £97 10
ROVER, 3-speed £80 0
ROVER, T.T., Philipson pulley .. £67 10

SECOND-HAND MACHINES.

1917 NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed ..... 35 gns.
1916 ENFIELD, 3 h.p., 2-speed .. 42 gns.
1915 INDIAN, 5-6 h.p., kick-starter, 3-speed ..... 35 gns.

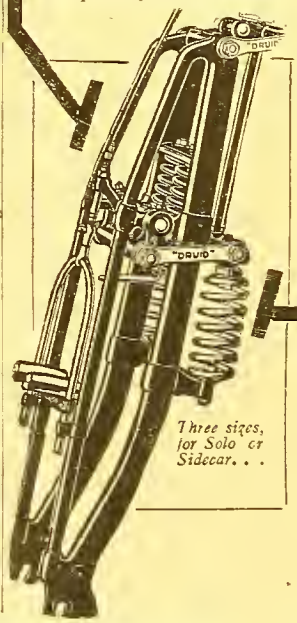
JULIAN,
84, Broad Street,
READING.

Biggest Light Car and Motor Cycle Dealer in the South.
'Phone: 1024. Closed Wednesdays 1.

Nothing unnerves beginners more than vibration. Later—nothing to counteract this satisfies like the

DRUID
MARK II.

Spring Fork—because nothing else designed so perfectly absorbs all classes of shocks.



Three sizes, for Solo or Sidecar. . .

To guarantee confidence on *all* your post-war rides—specify the DRUID.

Details free.

A. Drew & Co., Ld.
Leopold Street,
B'HAM.

E.H.S.

MOTOR CYCLES FOR SALE.

Matchless.

MATCHLESS.—Earliest deliveries in the trade 8h.p. J.A.P. War Model; exchanges arranged desired.—Maudes', 100, Gt. Portland St., London, W [5

MATCHLESS, 1915, Model 8B, 3 speeds and kick start, Lucas dynamo lighting set, coachbuilt sidecar, splendid condition; low cash price.—Maudes 100, Gt. Portland St., London, W.1. [6

Motosacoche.

1911 2½h.p. Motosacoche, wants new belt, otherwise sound; £6, or offer.—Write, Lane, Westholme, Holbeach. [6

MOTOSACOCHE, 2½h.p., mag., Senspray carburetter, recently overhauled and fitted with new cylinder and piston, good condition; bargain, £11/11.—18, Ilford Rd., Leamington. [X6

New Hudson.

NEW Hudson, 3½h.p., 3-speed, and new coach built car; £32/10.—Motor Exchange, Horton St., Halifax. [6

3½h.p. New Hudson, 1914, fitted with a handsome coachbuilt sidecar, 3-speed gear, and kick starter, includes accessories; bargain, £45 the lot, complete.—Wauchope's, 9, Shoe Lane, London. [6

New Imperial.

CROW Bros., Guildford.—New Imperial, all models new and second-hand, in stock. [5

NEW Imperial-Jap, 8h.p., 3-speed War Model combination; 109 gns.; delivery from stock.—Exe Motor Cycle Co., Ltd., Bath Rd., Exeter. [3

NEW IMPERIAL, 2-speed, clutch, and kick-starter £54/5/6; 1916 2¾h.p., 2-speed. £30/10; Part or exchange.—Service Co., 292, High Holborn, London. [6

2½h.p. 1917 New Imperial-Jap, 2-speed countershaft gear, kick starter, and free engine, smart machine, as new in every detail, includes accessories; guaranteed.—Wauchope's, 9, Shoe Lane, London. [6

NEW Imperial Motor Cycles, 2 speeds, clutch and kick starter, and lady's models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [6

Norton.

NORTON Big Four, all chain drive; £82/10; in stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter [3

T.T. Free Engine Norton, 3½h.p., good condition trial here; £20.—Manager, Indian Queen's Mill, Fraddon, S.O., Cornwall. [6

TWO 1915 3½h.p. Nortons, T.T. models, in sound condition and good running order; £40 and £45 respectively.—Wauchope's, 9, Shoe Lane, London. [6

N.S.U.

N.S.U., 3h.p., change gear, mag., low position; £8 appointment.—Miss D. Minns, Mayall Rd., S.E. [6

N.S.U., 3h.p., 2-speed, fine condition, £11/10; 3½h.p. 2 speeds, new coach sidecar, £22/10.—Collier Motories, Deal St., Halifax. [6

N.S.U., 3½h.p., nearly new tyres, belt, Bosch, Senspray, engine lately overhauled; £10/10, offer appointment.—25, Strafford Rd., Acton. [6

HAVING Acquired the entire stock-in-trade of N.S.U. Motor Co., Ltd., we can supply spares practically all types of N.S.U. motor cycles. In order it is important to submit old parts as patterns.—Eagle and Co., Actoo Hill Works, Acton, W.3. [0

N.U.T.

1914 T.T. N.U.T., 3½h.p., 3-speed, o.h.v.; £30 Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0

O.K.

NEARLY New Single speed O.K., 2-stroke, 2¼h.p. Dixie mag., driven off main shaft; absolute bargain, £12/12; deposit system.—185, Brighton Rd., South Croydon. [X6

O.K., 1915, 2 speeds, 2¾h.p., 2-stroke, engine just rebushed, frame re-enamelled, like new; bargain £20, or nearest.—Murphy, 36, Vansittart Rd., Forest Gate, E.7. [6

Peugeot.

1913 6h.p. Peugeot Twin, Nala gear, Millford car, speed; offers.—F. Catley, 204, Frome Rd., Writhlington, near Bath, Somerset. [X6

Precision.

TORPEDO Precision, 3½h.p., touring model, 1913; Bosch magneto and Senspray carburetter, has been stored for a considerable time and hardly been used; bargain, £15.—Maudes', 100, Gt. Portland St., London, W.1. [6

3½h.p. Twin-cyl. Precision, 2-speed countershaft gear model, chain-cum-belt transmission, T bars, red tank, up-to-date in appearance, includes lamps and horn; £35; guaranteed.—Wauchope's, 9, Shoe Lane, London. [6

Premier.

PREMIER, 3½h.p., 3 speeds, low position, perfect 16 gns.—77, Acre Lane, S.W.2. [6

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ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

The Petrol Rumour.

WHEN last January the first signs of the rumour that petrol was to be released for pleasure riding in the summer months was heard we contradicted it, and we have done so several times since. The rumour was very persistent, and although we knew it had no foundation in any official statement, and dealt with it as such, we felt all the same that perhaps the wish, besides proving father to the thought, might also lead to some definite action being taken in the direction indicated. As we announce in this week's issue, those munition workers who have petrol licences and permits to use their machines for travelling to and from work are now to be allowed to use these machines (after the workers have obtained a special permit) for travelling to and from the place chosen for their holiday.

This does not mean that new petrol will be issued, and, moreover, it only applies to those munition workers who live a considerable distance from their work, because those who live fairly close will not have had petrol granted to them. Further, it means rather more than this: it means that every man to whom petrol is due is normally resident in the country, because, if he is resident in a town of any size, 'bus and tram services would have prevented his being granted a permit to use his motor cycle.

The permit also is to apply to motor cycles only, so if a wealthy munition worker has purchased a car he will receive no benefit from the new Order. Moreover, motor cyclists who are not engaged directly on munition work, and whose machines are lying idle in their garages, even although there may be a good stock of petrol bearing the machine company, will not benefit unless they happen to be the possessors of permits already, which is very improbable.

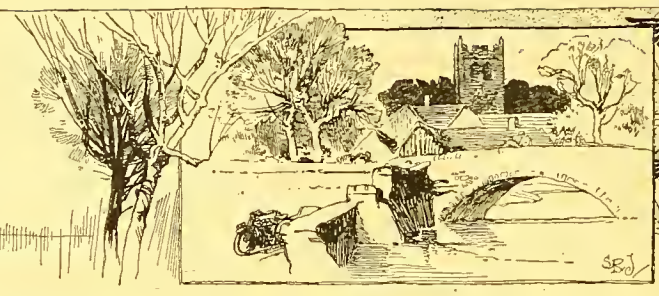
It would be absurd, of course, as well as extremely petty to begrudge these fortunate individuals the permits they have obtained as the result of prolonged and often ill-considered agitation. All the same, many are bound to feel a trifle piqued that those motor cyclists who are using their machines daily are to be allowed to use them at holiday time as well, while a man whose machine has been laid up for a year or more is to be denied a similar opportunity.

Life at the present time is essentially socialistic. Never at any time in modern history have the interests of the individual been so subordinated to those of his fellows and those of the State. Every daily action of the law-abiding citizen is now regulated by some Government Order, and however individualistic some of us may have been we have now come to make a virtue of necessity and to look upon individualism as a thing of the past, and perhaps of the future, but certainly not of the present. Consequently the shock to our well-ordered susceptibilities on finding out that at least one section of the community is to be granted specially favoured treatment is somewhat severe. Add to this the fact that preferential treatment in this particular instance is being granted in a matter in which feeling has long been running high and one may appreciate with little difficulty that the situation has many unpleasant aspects.

We have nothing to say against munition workers being allowed to ride their motor cycles to the place selected for their annual holiday, but we think that the privilege might well be extended to all who have petrol sufficient for the purpose. The railway congestion would thus be relieved to a far greater extent, and every class would be treated alike. It is perfectly true that the munition worker has deserved well of his country, and is entitled to any pleasure he can legally obtain, but this is also true of countless others who are engaged in equally important duties not connected with the output of munitions. In fact, every man who is honestly doing the work assigned to him in any sphere whatever is a good citizen, and as such entitled to every privilege that can reasonably be granted to him.

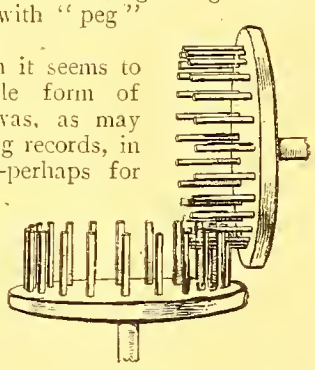
An index to the advertisements in this issue will be found on the page facing the back cover.

SOME CASUAL NOTES.



IN a recent issue of *The Autocar* there was an interesting article describing the first patent taken out for bevel gearing, and a request was made that any reader who could point to its being in use prior to the date of the patent should communicate with the Editor of *The Autocar*.

The origins of a good many of the simpler forms of mechanism are, as the phrase goes, lost in antiquity. With regard to bevel gearing, evidence as to whether the actual toothed form which we know at the present day was used before Mr. Rapson's patent was taken out has yet to be found. A research amongst old prints of windmills, for instance, might reveal some form of gearing analogous, if not similar, to bevel gearing. A very old method of transmitting power from one shaft to another at right angles to it was by means of wheels with "peg" teeth as shown in sketch.



An ancient method of transmitting power from one shaft to another.

Worm gearing, although it seems to us a slightly less simple form of gearing than the bevel, was, as may be ascertained from existing records, in use a considerable time—perhaps for centuries — before the patenting of the bevel gear. I have before me a description of its being used about 1750 in connection with an automatic arrangement for causing the sails of windmills to face the wind. Some form of worm gearing may have been in use before this time for clock mechanism.

After the wheel, the screw is one of the simplest and oldest forms of mechanism, but as to its origin I have no data, though aware of a particularly villainous example extant in the middle ages—to wit, the thumb-screw, beloved of the inquisitors.

Propellers and Screws.

Although the modern screw propeller of the steamship (and the forerunner of the aeroplane propeller) superseded the paddle in general use, it was suggested as a means of propelling steam boats quite as early as the paddle form. Regarding the "air" propeller, or screw, this must have been in the minds of the natural philosophers from the earliest days. How many of us in our youth have amused ourselves with the natural propeller thrown off at a certain season by the sycamore tree?

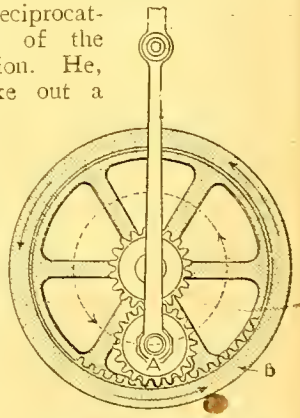
In modern engines, as we know, the moving of the valves is automatically carried out by what we call valve gears, but in the early days of the steam pumping engine the valves were hand operated. I wonder if all readers of *The Motor Cycle* know the "story" of the invention of the automatic valve gear? The following is culled from Prof. Perry's book on the steam engine:

The Invention of Valve Operating Gear.

"About 160 years ago, when the oldest Newcomen pumping engine moved very slowly, boys did perform the proper operations, and there is a story (it is probably untrue, but this is of no consequence to my present purpose) about a boy named Humphrey Potter who, when in charge of the engine-room, much desired to play marbles upon the engine-room floor, which was well suited to that interesting game. A friend used to come and jeer at him, playing marbles in his sight. Thereupon he invented the first valve gear. His master one day entered the engine-room and caught Humphrey playing marbles. His first duty—that of punishing Humphrey—was strenuously performed, and only then did he notice that the engine was faithfully performing its duty, and that the ingenious Humphrey had so arranged certain sticks and strings that the valves were opened and closed at the proper times by the automatic action of the engine. . . ."

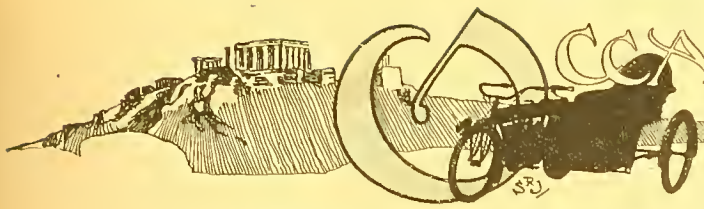
Cranks and Planetary Gearing.

Another simple and ancient mechanism is the crank. It is said that James Watt was the first to think of applying the crank to the steam engine for converting the reciprocating and rectilinear motion of the piston rod into rotative motion. He, however, neglected to take out a patent, and one of his workmen communicated the idea to another person, who patented the application. On being informed that his invention had been patented by another, Watt set about "accomplishing the same end by other means," to use his own words. The result was that ingenious alternative to the crank, known as the sun and planet wheels. A sketch of the arrangement is given. It had the then advantage that the flywheel-shaft was made to run at twice the speed that it did with the crank, for the same engine speed.



The sun and planet chain speed gear invented by James Watt. B makes two revolutions whilst A is making one.

ENGRO.



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BY "IXION"

Prejudice.

MR. G. T. WADDINGTON asserts in our Correspondence columns that the only good Boche is a dead Boche. In theory we are all inclined to agree with him: a kind of resentful bristling overcomes most Britishers at the mere sight of a Boche prisoner, or even of a page of heavy German print. Musing over Mr. Waddington's irate letter, I reflected that the soundest Boche-hater I know is a German girl, who can hardly speak a word of English. She married a British friend of mine in Hamburg in 1913. When war broke out, he was promptly interned, and she was forwarded to England *via* Holland as a *bouche inutile* (useless mouth). Anglicised by her marriage she has jumped to the conclusion that a nation which can imprison her dear Fred for four solid years must be detestable to the core, and she can now give Mr. Waddington points in anti-Boche prejudice.

Speaking for Myself.

TO my mind, the national vice of Germany is docility. The Germans take their opinions ready-made from a controlled press, just as they surrendered to the artificial atmosphere of conceit, bellicosity, and fear inspired by a State educational system. How far the average individual German is to blame for accepting second-hand convictions to order, I cannot estimate: because I have been reared in a free country, with a free press, under an educational system which gave every shade of thought, political, religious, or technical, a free hand. I always feel that if I had been born a German, educated in German schools, drilled in the German army, nurtured in the German press, I might have given the same general assent to German policy which the average German does. So I suspend my judgment of individual Germans, deprived in an enormous degree of first-hand knowledge of the most vital facts. The German press to this day suppresses all mention of German brutality, and vilifies the Allies with inventions, misrepresentations, and lies, as a reference to a single issue of any German journal will show. So my order of blame runs something like this: (1) The German Government. (2) The German educational system. (3) The German press. Germany's crimes are primarily ascribable to Germany's rotten Government, abetted by the innate docility of a nation in blinkers.

The Individual Hun.

OVER and above this general indictment, the world asserts that there is a larger percentage of brutes in the German nation than in any other people. In other countries Governments attempt to suppress and reform brutes, even in war-time; in Germany the Government deliberately exploits its innumerable brutes for its own purposes. Hence Mr. Waddington's dictum that the only good Boche is a dead Boche. None-the-less, he exaggerates. It is pitiful to read some of the captured diaries and letters of German officers and men who have been disillusioned by what they have seen and suffered. They have come to view their own national record as we view it; and this earth offers few more pathetic spectacles than that of a decent man hopelessly entangled in the remorseless mechanism of an evil cause. Thus we read on the one hand (*The Motor Cycle*, July 11th, p. 30) of German machine gunners ceasing machine gun fire because they think French wounded are crossing their front; and on the other hand we hear rumours of the Hun bayonetting his own "cot cases" at Ham last March to reduce the strain on his communications and medical corps during a big push.

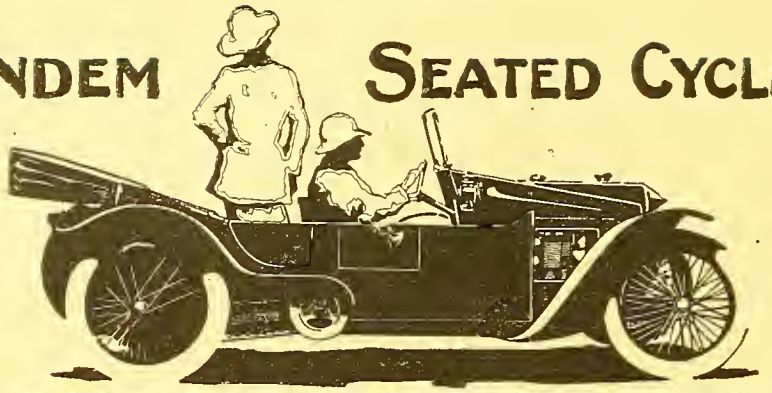
The Single-cylinder Cycle Car.

I HEAR with great pleasure that a Norton single-cylinder cycle car is on the *tapis*. The Rudge ditto was quite the most interesting bantling in the last litter, though it never reached the production stage, and many veterans have pleasurable memories of the early "quads." These quads were extremely slow, twenty miles per hour being their outside limit on ordinary roads, whilst a stiff head wind slowed them down to 12 or 15 m.p.h. This was their main defect, and was chiefly ascribable to (*a*) inefficient engines of 2¾ h.p.; (*b*) insufficient gear ratios, *e.g.*, two speeds of 6 and 12 to 1 respectively; (*c*) excessive gear friction, due to pre-historic applications of the epicyclic principle. Apart from their slowness, they were extremely noisy, and their coil and accumulator ignitions demanded frequent adjustment. On the other hand, to the best of my recollection they were quite comfortable. The price of such machines as the De Dion, Ariel, Dennis, Speed King, and Peugeot, ranged from £110-£150.

A Modernised Quad.

CONSIDERING the possibilities of a modernised quad, one can reckon on marked price reductions. All the early quads were hand-made jobs, turned out at the rate of one or two per week; perhaps Mr. Sangster will look up his records, and tell us what the annual output of Ariel tricycles and quads actually was. A modern engine of 650 c.c., in conjunction with a modern three-speed gear, would afford a vastly improved average speed and faster climbing. The magneto has revolutionised the ignition. I do not know that this old system of slinging the passenger in a forecar and hoisting the driver high up on a saddle behind need be retained, but if a narrow track is desirable in the interests of lightness, the tandem seating is not grossly objectionable. Anyhow, Mr. Norton is going to bring out a modern quad, and I hope the Rudge people will revive and perfect their cycle car: the history of sidecars shows that 8 h.p. is by no means essential for passenger work.

THE TANDEM SEATED CYCLE CAR



BRITISH, CONTINENTAL & AMERICAN DESIGNS COMPARED

A Review of their Respective Merits and the Probable Post-war Market of each. By one who has followed closely the Evolution of the Simple Cycle Car.

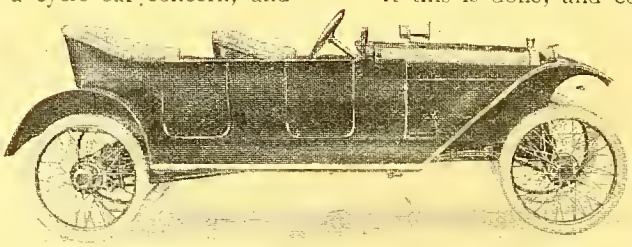
THE tandem cycle car embryo was a soap box on four wheels, and, in the words of a cynic, it failed to "hatch out." Apart from its mechanical deficiencies, the tandem-seater was foredoomed on account of its poor appearance. One has only to look at the pictures of an early Bedelia, a Sabella, or a Rollo to appreciate this. The "demand" for side-by-side seats and the endeavour to meet this demand cut short the development of the tandem-seater. This demand came about through half-imagined inconveniences of the tandem-seater. The people who went to buy it had been led to believe that they were being offered all the comforts and conveniences of the car at the cost of motor cycling. They were disappointed.

The Half-way House.

The chief points cited against the tandem-seater were its unsociability, its low build, and its unconventional appearance, and I maintain that the majority of potential buyers who brought forward these complaints had already decided against the sidecar combination on the same score.

In passing I may mention that I was in attendance at Olympia on the stand of a cycle car concern, and most of the enquiries came from people who considered the sidecar *infra dig.* Motor cyclists were interested, too, and had the mechanical features been up to the standard of their motor cycles, they would have purchased because they wanted to drive a machine rather than ride it. In their eyes the unconventional appearance and low build were not points against the cycle car. In fact, the appearance of some of the machines strongly appealed to them, but when they examined the mechanics, they raised their hands in horror and decided to forego the luxury of a body and go in for something they knew to be mechanically reliable.

If we are to have cycle cars in the future, let there be no artificial booming and no extravagant claims.



The Ceco cycle car, with chain drive, enclosed in cork-lined tubes the outlines closely following those of the orthodox four-seater car

The cycle car was not intended to be a cheap car or a substitute for a sidecar-combination—but it can be a totally different type of vehicle which may be used as a stepping stone between the two. To claim the advantages of a car is absurd, but there is no reason why we should not have cycle cars as efficient as motor cycles and providing some protection for the driver. Potential buyers of the cycle car want motor cycle efficiency plus the comfort enjoyed by the sidecar passenger. With this they will be content, and the best way to obtain this is to forget that the car has side-by-side seats. In appearance the cycle car must not imitate the car. That is going too far. In mechanics it must be a job designed as a cycle car, and not an adaptation of motor cycle engines and gear boxes fixed in a "body" reminiscent of the coffin makers' craft. This latter point is the other extreme. Between the two—the bodywork of a light car and the soap box contraption originally introduced—a suitable body, distinctive without being unorthodox, and simple but pleasing, to the eye, may be found.

Advantages of the Tandem-seater.

If this is done, and considered in conjunction with the mechanical elements and the price factor, the tandem-seater will be found to be the most suitable. The "chassis" is narrower. This means that it can be made lighter, because a narrow frame has not the same tendency to whip. With a narrow track the differential can be dispensed with and the overall width will be such that the garage accommodation problem becomes less acute. A vehicle with a 3ft. track will go through the same gateway as a sidecar combination, while, as regards comfort, seats 2ft. wide can be provided, which is more room than one obtains in the average big car, while the seat width of the majority of light cars is considerably less. Surely it is better to have two good wide seats than for two persons to squeeze into a seat 3ft. wide!

ARIEL

Hill-climbing Extraordinary

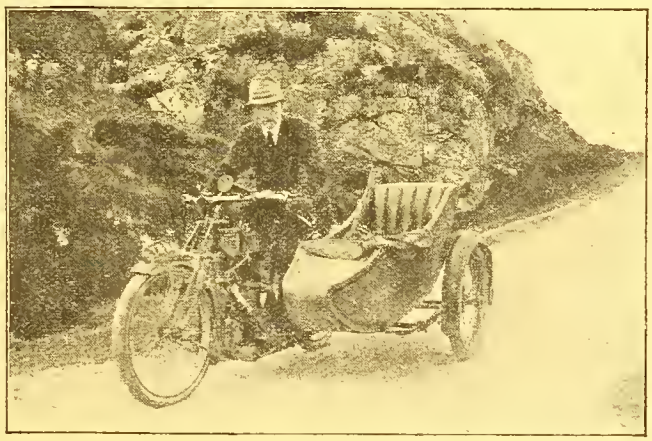
The Ariel greatly surprises a Scottish owner.

"I feel it is only fair that I should send you a few words of appreciation of the 3½ h.p. Countershaft Ariel. My official duties in this island take me over roads of the most primitive kind and in climatic conditions that are a strain upon rider and machine. Although I am not over fond of riding with a sidecar, yet solo riding is impossible here; consequently, I have attached a coach-built sidecar to my Ariel. Having occasion recently to travel to Tarbert Harris, I had a very fair opportunity of trying the bike's powers. My sidecar weighs 112 lbs.; I had a passenger of 10 stones, plus a portmanteau. To my great surprise, I climbed a famous hill (the Clisham) with some 'throttle' to spare. The hill rises 800 feet in about a mile, and has a glorious hairpin half way up. As this is about the second hill in Scotland, I was greatly pleased with my mount. I caused a bit of a consternation here, where 6 and 7-9 h.p. combinations are the rule.

"H. T. WILLIAMS, Stornoway."

Art List post free from

ARIEL WORKS, Ltd., 3, Bournbrook, BIRMINGHAM



Mr. Williams on his 3½ h.p. Ariel Combination.

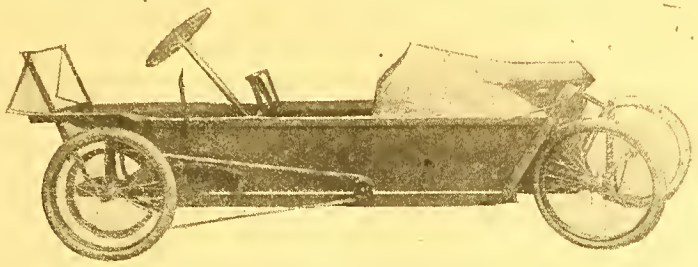
In answering this advertisement it is desirable to mention "The Motor Cycle."

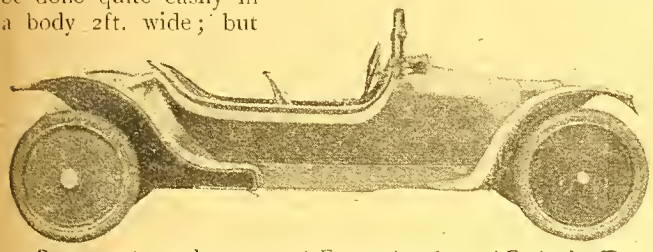
A13

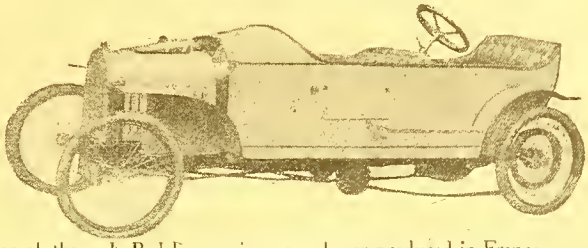
Look out Bill,
there's a ------
shell hole ahead.
BEFORE
SETTLING YOUR
AFTER THE WAR
CONTRACTS SEE
THE
P&H
POWELL & HANMER LTD
BIRMINGHAM
ELECTRIC SETS FOR
MOTOR CYCLES.

The Tandem-seated Cycle Car.—

It is said that the tandem arrangement of seating is unsociable, that it is difficult for the driver and passenger to carry on a conversation. The driver and passenger of a sidecar combination cannot converse with the same ease as can two people in a car, but by staggering the seats so that the legs of the passenger are accommodated alongside the driver's seat, a very good compromise is attained, and this can be done quite easily in a body 2ft. wide; but with a 3ft. track the designer can go up to 2ft. 6in., when the rear seat can be made to accommodate a child in addition to an adult passenger.





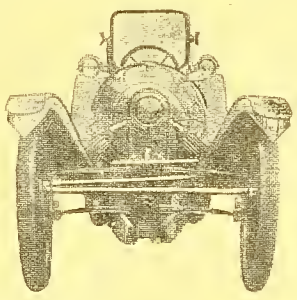


Representative tandem seaters of France, America, and England. Top: One of the early Bedelias, a pioneer cycle car produced in France. Left: The Robie, a pleasing American design. Right: The English Rollo.

It will be seen from some of the illustrations that a tandem body can be made quite pleasing to the eye. The Scripps-Booth (shown in the heading) and Robie American designs by no means are ugly, as were the Bedelia and Rollo, produced in France and this country respectively. The Robie has the semi-staggered seating arrangement mentioned above, while in both designs the seats are higher from the ground level than the average sidecar.

To those who prefer higher bodies, the Ceco (U.S.A.) may appeal, but here we are getting into the imitation car class, and this is dangerous, for if a vehicle resembles a real car so closely in its general appearance that it is liable to be mistaken for one of the type with which are associated silence and certain "orthodox" practices in its mechanical elements, then it must follow those mechanical practices. A "car" with chain or belt drive will not sell. A cycle car, if it is clearly in a class by itself, may employ any mechanical system which it is possible to prove reliable to the many potential buyers.

That English makers can produce such a vehicle I have not the slightest doubt, but designers must not be blinded by their own enthusiasm. They must make it pleasing to look upon: neither an imitation car nor a hybrid, and it must be as reliable as a motor cycle, reasonably quiet, and well finished. It must also be the product of a well-equipped factory able and willing to guarantee an adequate supply of spare parts.



SPES.

MORE NOTES ON ALCOHOL.

A PAPER published in Western Canada reports that from experiments made locally a ton of dry sawdust has been found to yield, with proper treatment, from twenty to twenty-five gallons of 95% alcohol-ethyl or grain alcohol, not wood alcohol. (This latter is useless for fuel purposes, owing to the formation of products of combustion which would have very deleterious effects on the cylinders.)

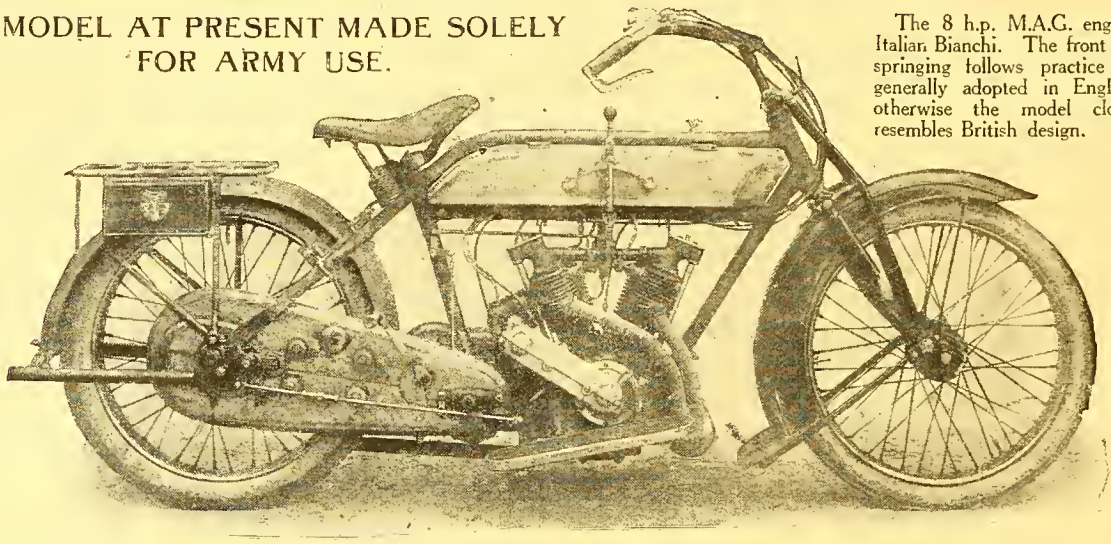
If the wood waste produced in the great river valleys of Central British Columbia was made available, a conservative estimate would place the output at 500,000,000 gallons of this Imperially produced fuel annually. The process of manufacture seems simple; the wood waste is broken down by distillation, and the wood alcohol produced converted into true grain alcohol.

It should be remembered that while the calorific power of alcohol is little more than one-half that of petrol, the greater efficiency obtainable from alcohol in a suitably designed engine more than compensates for this. Moreover, for the complete combustion of alcohol only a third the usual volume of air is required, and less energy is dissipated in the exhaust. The alcohol air mixture can be subjected to a 200 lb. per square inch pressure without spontaneous ignition (as against 80 lb. per square inch for petrol), and the combustion products are smokeless and almost odourless. One disadvantage is that it does not provide easy starting, which would probably necessitate the fitting of a small auxiliary petrol tank.

The cost of production is phenomenally low, as the spirit is produced from waste products, of which there is an illimitable supply. It is earnestly hoped that this venture will receive official encouragement, for in fuels produced within our Empire seems to lie the only prospect of future freedom from exorbitant charges for inferior spirit.

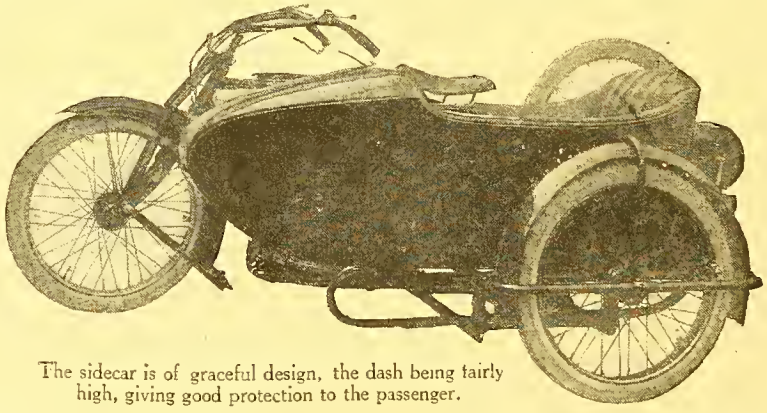
A NEW PRODUCT BY OUR ITALIAN ALLY.

A MODEL AT PRESENT MADE SOLELY FOR ARMY USE.



The 8 h.p. M.A.G. engined Italian Bianchi. The front fork springing follows practice not generally adopted in England, otherwise the model closely resembles British design.

ONLY last week we half suggested that Italy might be entering the motor cycle market in a serious spirit after the war. We are now able to give the first English description of the twin Bianchi—a product of the famous car manufacturing firm. The general soundness of the design is at once evident from the photographs, and with the single exception of the back wheel rim brake there is little in the general design different from standard English practice. This brake is, however, a temporary measure and only an auxiliary, the main back wheel brake being of the internal expanding type. The engine is, as may be seen, the famous M.A.G., though after the war the makers of the machine intend to build an engine of their own. The spring forks are somewhat unusual in design, and it is on this account that both brakes have to be fitted to the back wheel, as the front fork will not allow of the fitting of a brake on to the front wheel. The fork end, as may be seen, is not coincident with the hub of the wheel, and consequently there is vertical play between the wheel and the fork members as the fork operates. The machine has all the latest English features incorporated, such as detachable and interchangeable wheels, chain transmission through a three-speed countershaft gear box, and the clutch in recent models is hand-controlled.



The sidecar is of graceful design, the dash being fairly high, giving good protection to the passenger.

The sidecar is of very pleasing appearance, and, besides being roomy and comfortable and having a rear locker for tools and spares, it also carries above this a spare petrol tank, which may be seen in the photograph.

If further Italian productions maintain the standard that appears to be set by this one, we shall look forward with real interest to developments, and especially to a new Italian flat twin model, of which we are not at present in a position to give particulars.

THE REAL ENGINEER.

LIKE Mr. Kipling's engineer, who, "if you left him alone with an oilcan and a King Dick spanner would teach a stolen bicycle to do typewriting," a certain garage proprietor whom we know is a man of infinite resource. With no better material than an aged piston and the handle of a spade, he has evolved a perfectly practicable apparatus for lapping in cylinders. Having made a vertical saw-cut in the piston (which was duly smeared with crocus powder), he inserted a little wedge, which, of course, expanded the diameter of the skirt as it was tapped in. The gudgeon pin was attached to the spade haft, which provided a very handy grip. He was just putting the finishing touches to a *monobloc* engine with this Heath Robinson device of his when we arrived. There is a legend afoot that he intends to convert his docile "one-lunger" Cadillac (*circa* 1898) into an aeroplane when the war is over.

CURRENT CHAT

Times to Light Lamps.

SUMMER TIME.

July 25th	... ...	9.28 p.m.
,, 27th	... ...	9.25 ,,
,, 29th	... ...	9.22 ,,
,, 31st	... ...	9.19 ,,

Thermal Efficiency.

If we could only use half the "power" that theory tells us we waste in known methods of using petrol in internal combustion engines, our engines would be very much smaller and our petrol mileage considerably greater.

Sidecars.

There are one or two "experimental" designs in sidecars running about in the Midlands. The works manager of the Triumph Co. uses a particularly taking sidecar. Finality has not yet been reached in the coach-built variety.

Petrol for Huns.

The Birmingham and District Committee of the Workers' Union has sent to the Prime Minister and Mr. Barnes a resolution protesting against the use of petrol for conveying German prisoners about the city when many of our men returning from the Front are obliged to wait at the stations from midnight till 5 a.m. before getting to their homes. Up to Christmas a number of motor owners drove home soldiers arriving on leave late at night, but petrol permits were then withheld and the work stopped. In spite of the appeals of the Lord Mayor and others permits are still unobtainable.

"The Petrol Cavalry."

This was the heading of a recent article in the *Daily Mail* describing the work of *pedal cyclist* units in France!

Certainly motor cyclists have acted as genuine "petrol cavalry" in German East Africa, but the only motor cyclist solo riders in France are the despatch riders and a few officers.

Metal Roads.

The metal roads of the future, projected from time to time, are in a fair way to being anticipated by Whitehall. In the low evening light the whole road surface gleams with etceteras which have been decanted by passing 'buses and taxicabs. Bedded deep in the wood surface and polished brightly are nuts (square and hexagonal), spring washers, wood screws, and bolts, the whole road speckled with these unconsidered trifles. And they do not seem to be missed.

The Atlantic Flight.

The American Air Board is considering sending planes to France by air to save shipping.

Diesel-engined Motor Cycles?

It is rumoured that Germany has produced a practically vibrationless Diesel engine which weighs only 3½ lb. per h.p., the fuel being paraffin.

Petrol for Church-goers.

Sir Albert Stanley, in the House of Commons, said it had been decided to permit the use of petrol in private or hired motor vehicles where no other means of conveyance were reasonably available for the purpose of attendance at public worship on Sunday, August 4th, when national dedication services are to be held throughout the country. An announcement on the subject will be made in the course of a few days.

The Motor Industry.

At the Birmingham Rotary Club, Mr. A. Butterfield, of Messrs. Butterfields, Ltd., Stechford, spoke on the future of the motor industry. He stated that in America the industry had received much more encouragement, with the result that while the population of the United States was only twice the population of this country the number of motor vehicles in use was at least five times greater. Yet there was actually a greater good road mileage in this country than in America.

Special Features.

THE TANDEM-SEATED CYCLE CAR

SOME CASUAL NOTES.

PETROL: CRIMES AND COMMENTS.

Ford Cars.

According to the daily papers, there has been an epidemic of Ford van stealing. Nothing like specialising.

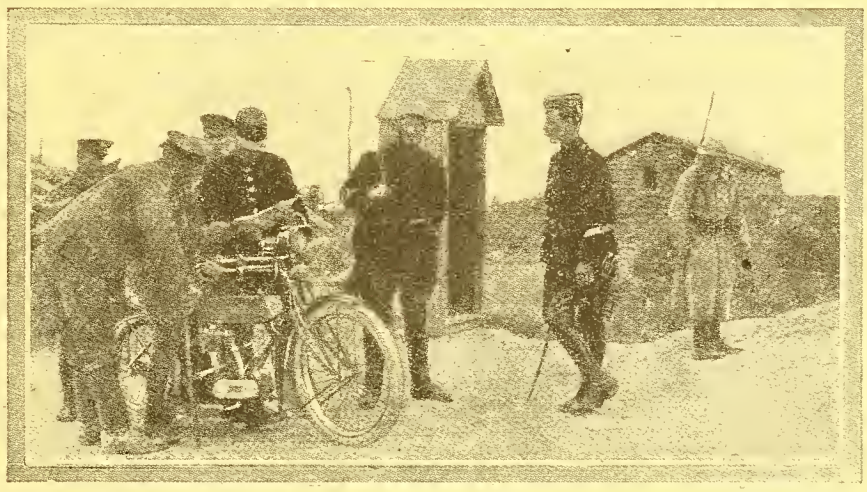
A Tip for Amateur Painters.

As paint brushes are so expensive at the present time, those who contemplate re-enamelling their sidecar outfits may be glad to know that brushes which have become hard and unusable may be restored by being suspended in a jar containing a solution of one part crystallised sodium carbonate to three parts water. The tips of the brushes should be hung clear of the bottom, and the jar stood in a moderately warm place.

The Industrial Reconstruction Council.

An interesting series of fortnightly lectures is to be given on alternate Wednesdays under the auspices of the above body, the first lecture of the series being one by the President of the Board of Trade on October 2nd, at the Saddlers' Hall, Cheapside, at 4.30 p.m.

A full prospectus may be obtained from the Secretary, I.R.C., 284, Tudor Street, E.C.4.



Guards examining the papers of a despatch rider at a point where the Belgian and English lines meet.

The Motorised Bicycle.

What is the future of motor attachments to pedal cycles? Some people think it is considerable, and among them is a well-known contributor to *The Motor Cycle*, who is dealing with the whole question in his usual exhaustive manner in an early issue.

Whatever may be said against these attachments, there is no doubt that they serve one very good purpose—that of excellent "R.O.'s" for the army of fully-fledged motor cycles.

Taxes and the Motor-assisted Pedal Cycle.

One drawback to the motor assisted pedal cycle is that it comes, of course, under exactly the same regulations as regards the law as the fully-fledged 8 h.p. sidecar combination.

Experts.

There seem to be many self-styled motor cycle experts Overseas. If only some of them could see each other's criticisms and compare them they would realise how opinions differ, to say the least. Meanwhile, they seem to think our manufacturers slow and unenterprising.

Slack Trade Development.

It would appear that during times of brisk trade and large demand the opportunity and inducement to manufacturers to make extensive changes in design is minimised for several reasons. The purchasers are anxious to get hold of any machine which is "good enough," and glad to get it in a reasonable time; also improvements can be introduced with much less trouble when the factory is slackened down. In slack times the buyers are much more exacting, and the maker feels the need of having his product up to date in every respect to cope with keen competition.

Imports and Exports.

The value of imports of motor cycles, tyres, parts, and accessories for June amounted to £109, or about one-fifth of last month's. The exports show an increase of over £12,000 above the corresponding period last year, bringing the total up to £92,759—nearly double that for May.

Petrol for Munition Workers.

Mr. A. W. Torkington, chairman of the National Motor Cyclists' Fuel Union, has recently made representations to the Petrol Controller's Department on behalf of munition workers, and it has been decided to permit those engaged in munition work who are motor cyclists, and who have either a current petrol licence or a stock of petrol obtained with a petrol licence, to use their motor cycles for the purpose of going and coming back from the place selected for their holiday. No extra petrol will be granted for these journeys, and riders will not be permitted to use their motor cycles for any trip during their holidays, other than the journey to and from the holiday resort. In each case a special permit, granted by the Petrol Controller's Department, will be required. Before this is granted the circumstances of the case will be investigated by Mr. Torkington and the Ministry of Munitions, who will satisfy themselves that the applicant has a *bonâ fide* claim to the concession. Preliminary application should be addressed to Mr. W. Ellis, 70, Abingdon Street, Derby.

Emphasis is laid upon the fact that the men to whom permits are granted are already entitled to use their motor cycles for going to and from their work, and that no extra fuel will be used by this concession.

We comment on the matter editorially this week.

Motor Cycles in India.

We understand that over 7,000 motor cycles have been registered in India

Won't Wash Clothes.

Present-day petrol will not wash clothes—it stains them. At least, so we are told.

A Remarkable Statement.

The President of the Petroleum Executive states that the petrol saved during the past year from civilian consumption is equivalent to a four months' supply for the Army in France.

Repairs Not Exceeding £10.

A paragraph in a recent issue stated that repairs to the extent of £10 could be executed on a motor bicycle without a priority certificate, provided that a declaration as to use accompanied the order. It is understood, of course, that the use referred to must be one of those permitted by the authorities, viz., professional use by doctors, dentists, veterinary surgeons, and officers of H.M. Forces, as set forth in a letter on page 44 (July 11th).

A Comment on Joining Up.

An official connected with a firm known in the motor and cycle world recently joined up, and sent out a letter announcing the fact. Commenting on this event, a contemporary said that the letter would be read with interest and sympathy, and expressed a sincere hope that the writer's military duties would be of very short duration, and that he would be able to resume his business avocation before many weeks were over!

And yet there are some contemptible men in the world who thought that joining up was an honour and a duty not to be avoided!

And how will the "before many weeks" be worked?

Minor operations on the Western Front. American motor cyclists in a French village disburdening their sidecar of mud.

THE MOTOR CYCLE

AVIATION SECTION

A New British Plane.

It is reported that not one of the new type aeroplanes now in use by the R.A.F. has been brought down by the enemy or failed to return. The plane carries a pilot, an observer, a great weight of bombs, and machine guns, and it can rapidly reach a height of 20,000 feet. The machines can fly low and outstrip any modern scout.

—◇□◇—

Transatlantic Flying.

According to *The New York Times*, Maj.-Gen. William Brancker, of the British Royal Air Force, has gone to America to arrange for military aeroplane flights from the United States to Europe, and to pave the way for sending American aircraft abroad on their own power.

It is calculated that a successful flight to Europe would, by wear and tear, consume less than one hundred hours of the life of an aeroplane or seaplane, leaving it a life of from 400 to 500 hours to be spent in fighting the Germans.

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The Uniform Once More.

R.A.F. uniform rumours are still rampant. The "wounded stripes" are coming off the cap, a "Sam Black" belt is possibly to be worn, and black boots are decided upon. Officers fear that the blue is likely to prove too delicate for aerodrome duty. White shirts and white collars likewise do not strike one as ideal for engine testing!

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Training for R.A.F. Recruits.

The East London College (University of London) has instituted a preliminary course in science and engineering for young men between 17 and 17½ years of age who are desirous of entering the Royal Air Force. The course, which will begin on October 1st, includes about thirty hours of instruction each week, but Saturdays will be left free. It will extend for about six months, with a short vacation at Christmas. The fee is £10 10s. for the course, or £11, including the College Union Society's subscription. A medical certificate will be required as a preliminary of admission to the course.

Lectures will be given on aeronautics, drawing office work, physics, electrical engineering, applied mechanics and engineering drawing, aeroplane engines, meteorology, the compass, astronomy, practical engineering, and military training in connection with an O.T.C.

As only a limited number of students can be admitted, it is necessary that applications for admission to the course should be made at once to the Registrar or to the Principal, J. L. S. Hatton, M.A., East London College (University of London), Mile End Road, London, E.

Gallantry in the Air.

In a supplement to the *London Gazette*, Sec.-Lt. Albert M. Kinnear, General List and R.F.C., is mentioned. When patrolling at a low altitude he was attacked by six machines, his observer was wounded, and his elevator controls on one side shot through, but he drove off the enemy. The next day he was wounded in the head, and both the petrol tanks were shot through, but he brought his machine back. He has been awarded the Military Cross.

Another winner of the Military Cross is Lt. Ronald F. S. Mauduit, D.G. and R.F.C., who on a photographic reconnaissance encountered twenty hostile scouts and drove down two. He has destroyed ten enemy machines.

Capt. William W. Rogers, R.F.C. Special Reserve, has shot down seven machines. He is described as a daring patrol leader, and has won the Military Cross.

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AIRMEN MOTOR CYCLISTS

A well-known motor cyclist in the North of England, Sec.-Lt. E. Saterthwaite, R.F.C., Holmgarth, Barrow-in-Furness, was killed recently while flying in Egypt. After despatch riding in Mesopotamia for about eighteen months, he entered a flying school, and very soon gained his wings, but later, we regret to say, met an untimely end through the engine stopping while flying. He was a keen motor cyclist and a good sportsman.

Late Sec.-Lt. E. Saterthwaite, R.F.C.

Obsolete Engines.

It is said that there are hundreds of obsolete aero engines at the different stores which may be disposed of at the end of the war. Here is a chance for Brooklands *habitués*. Why not a special class for cars fitted with aero engines prior to 1916, for instance?

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Austrian Women Aviators.

When Italian cavalry occupied Fieri they found an aerodrome intact, with several aeroplanes standing on the ground. At that moment, says the Central News Rome correspondent, an enemy machine landed, not knowing what had happened. In it were an Austrian and four women.

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Air Fighting—An Opinion of Yesterday.

It is rather amusing to read the opinions of an aviator on combat flying as expressed in a contemporary of September, 1914:

"Fighting in the air is the most ridiculous part of a comic business. I am somewhat loth to say much about it, as it is rather popular among important people like novelists and members of Parliament. (A little spleen there!) . . . I myself have no wish to flit about with bombs and an automatic gun trying to damage fellow aviators. I have too much respect for them. I should also regard it as distinctly unsportsmanlike if anyone flew at me with hostile intentions."

Ah, well, as the old gentleman sighed in "Milestones," "We live and learn."

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"The Herring Pond"?

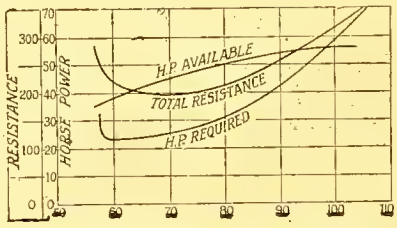
Just four years ago the first Curtiss flying boat was built for a Transatlantic flight. She was christened "America," and was flown on Lake Keuka by Glenn H. Curtiss and Lt. (as he then was) John C. Porte. She flew fast, and had plenty of reserve power; "steady as a rock" was Porte's description of her, though, oddly enough, she elected to take the air at a negative angle, with her tail somewhere up in the clouds. Her weight empty was 3,000 lb., fully loaded 5,000 lb. She was to have averaged 62 m.p.h., and all arrangements had been made for the flight, right down to the petrol supplies at the Azores, where the first stop was to have been made. But a great deal of water has flowed under the bridges since then, and with the immeasurably improved machines of to-day the Atlantic flight is a proven possibility, and may within our time become a commonplace. Nor is there any reason to suppose that this performance will necessarily be deferred until after the war.

FLYING FACTS AND THEORIES.

POWER AND RESISTANCE. Part II.

By W. G. ASTON, A.F.Ae.S., A.M.I.A.E.

IN the previous article I showed how the total resistance of an aeroplane was composed of two factors due to the body and the wings respectively, and reproduced a curve indicating how this total drag varied at different speeds. The same curve is again reproduced herewith, and is now made the foundation for further analytical development. Knowing the resistance in lb. and the speed in feet per second, simple multiplication and division is all that is required to ascertain the horse-power required to overcome this resistance at various speeds. Using the formula $\text{h.p.} = \frac{R \times V}{550}$ we find that, with the total resistance as given, the thrust horse-power required is as represented in the lowest of the three graphs. Note that as in this value the speed factor enters in for the third time (that is to say, other things being equal the power required for an aeroplane varies directly as the cube of the speed), the curve acquires considerable boldness of outline, and, once having settled down, so to speak, clear of the stalling point at about 57ft. per second, it begins to climb rapidly. This stalling point in the h.p. curve is not without interest, as it indicates clearly what an immense access of power would be required to develop an adequate lift at anything less than stalling speed. At the same time it will easily be realised that below this point it is somewhat difficult accurately to measure the resistance of the aeroplane, owing to the air flow round being not only discontinuous, but also by no means definite. That is to say, one kind of flow may suddenly alter and become another, with the consequence that the curve of the resistance and what immediately depends upon it, the curve of h.p. required, become a little hazy at stalling speed.



Graph relating to the body resistance of an aeroplane, the horse power available and required.

The Thrust of the Air Screw.

The next move is to compare the horse-power required with the horse-power that is available from the engine. Since throughout the whole scale the latter is naturally supposed to be "all out" and doing its full revolutions, it might be assumed, at first glance, that the engine power could be represented in the figure by a horizontal straight line, whereas in point of fact it is indicated by a pronouncedly curved one which shows a considerable falling off in power as the aeroplane speed decreases. This is because the "h.p. available" graph represents not the actual h.p. of the engine, but the amount of power transmitted through the screw in the form of thrust. Now the efficiency of a screw varies with aeroplane speed, reaching its maximum at the maximum speed of the machine and decreasing with decreasing speed. This is because, as explained in a previous article, the less the screw moves forward axially the greater is the angle of incidence of its blades, and hence the greater is the load on the engine. If the revolutions of the latter are decreased, the power output is also decreased. Hence you get a loss of power in this direction, and you also get a further loss by reason of the fact that at big angles of incidence the lift-drag ratio of the screw blade is less than what it is at small angles of attack. While, therefore, the engine actually remains "all out," the actual thrust delivered falls off considerably at the slower speeds. If the aeroplane is fitted with a satisfactory form of variable pitch screw, the h.p. available could be represented as a nearly horizontal straight line.

We can now forget the curve of total resistance altogether, and simply consider the relationship between the two other graphs. It will first be observed that they intersect at about 99ft. per second. This speed is in consequence the maximum of which the aeroplane is capable whilst flying perfectly horizontally—*i.e.*, neither losing nor gaining altitude. It can, of course, fly faster whilst losing height, as in this case it can borrow power from gravity. The vertical height between the two curves to the right of the 99ft. per second mark (67½ miles an hour) represents the amount of power which it will be necessary to borrow in this way from gravity for any particular speed, and from this value can be directly deduced the descending angle at which the machine must fly to attain this speed.

The lowest safe flying speed is obviously a little less than 60ft. per second (nearly 41 miles per hour), as at any less speed the machine will be in danger of stalling.

Flying Facts and Theories.—

Now it is often stated that the best climbing speed is the same as the lowest safe flying speed. This is, however, by no means the case, as the curves show very clearly. Referring to the h.p. figures at the right-hand side of the chart, it will be perceived that, whereas at 60 ft.-sec. there is a difference of about 15 h.p. between what is required and what is available, at about 75 ft.-sec. there is a difference of 20 h.p. This excess h.p. can be directly utilised in climbing, and from its value and the weight of the aeroplane can be immediately calculated the maximum rate of climb. Supposing, for instance, that in this case the machine weighs 2,000 lb., the rate of climb at any speed will be given by the formula:

$$\text{Climb per sec.} = \frac{\text{Excess h.p. at any speed} \times 550}{2{,}000}$$

$$\text{Climb at 75 ft.-sec.} = \frac{20 \times 550}{2{,}000} = 5\tfrac{1}{2} \text{ ft.-sec.}$$

$$= 330 \text{ft. per min.}$$

The curves thus directly give us information on the following points—maximum speed, minimum speed, and best climbing speed and rate of climb. The last-named has to be modified with changes in altitude, as I have fully explained in a previous article, "The Effects of Altitude." But yet another result is equally easily obtained. Given the horse-power required and the weight of the machine, we can ascertain very readily the gliding angle at any speed, inasmuch as this h.p. must now come from gravity, and can thus be simply expressed as the amount of height lost per second.

From these figures we can find, as I will show in a further article, the best gliding angle, which determines the radius in which the pilot can choose a landing ground in the event of any engine stoppage. Another point which also requires consideration is the "most economical flying speed." In other words, given a definite supply of fuel, at what speed must the aeroplane be flown in order to cover the longest distance?

DECORATING THE 'PLANES.

An American Correspondent's Pen Pictures.

THAT liveliest of American special correspondents, Irvin S. Cobb (the man who went to see the war in a taxicab in 1914, and got captured by the Germans!), is back again on the Western front. That acquisitive eye of his has noted some vivid little pictures in the aeroplane parks behind the British lines. We quote from a recent article in the *Saturday Evening Post*:

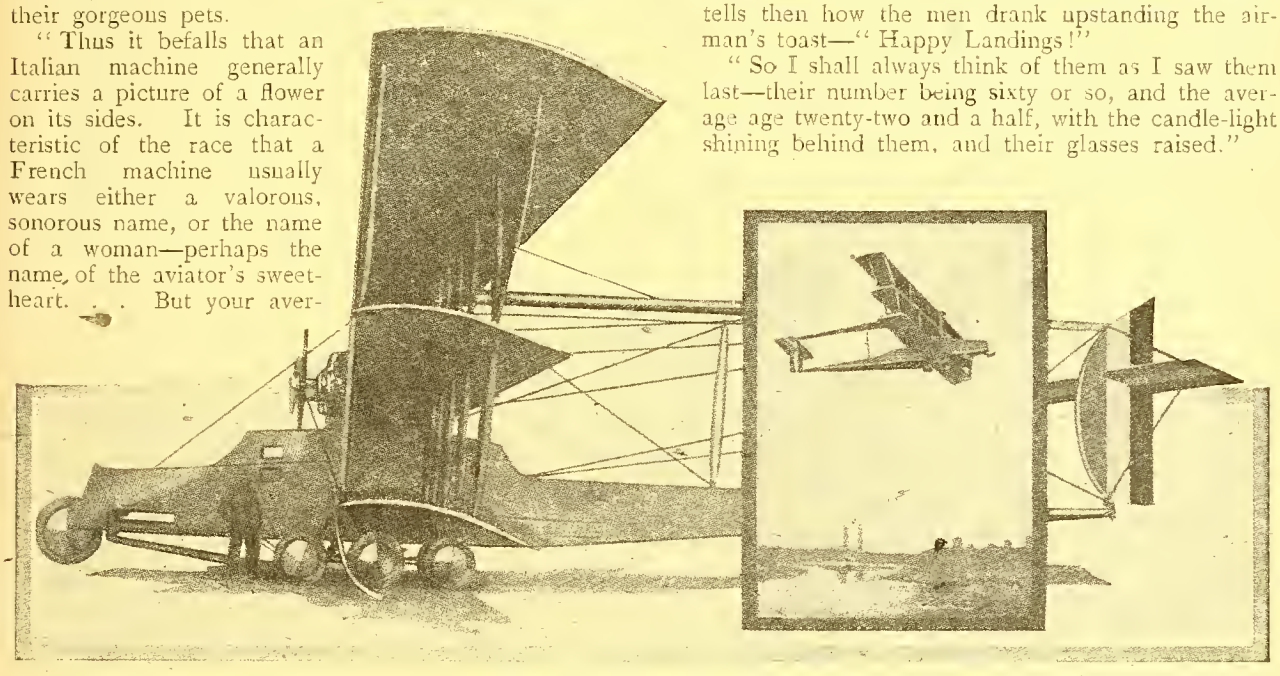
"Right here I am reminded that the temperamental differences of the Allied nations are shown most aptly, I think, in the fashion in which the aviators decorate their gorgeous pets.

"Thus it befalls that an Italian machine generally carries a picture of a flower on its sides. It is characteristic of the race that a French machine usually wears either a valorous, sonorous name, or the name of a woman—perhaps the name of the aviator's sweetheart. . . . But your average British airman is apt to christen his machine 'Old Bill,' or 'Gaby,' or 'Our Little Nipper,' or 'The Walloping Window Blind.'"

Cobb, who can be mordant when he likes, speaks of the sentimental German with tears in his voice "singing his songs of the home place and the Christmas tree and the Rhine Maiden as he marched past a burning orphan asylum in Belgium."

While he was at a mess dinner bad news of a sister squadron was received, the almost brutally curt official "Three of our machines failed to return." And he tells then how the men drank upstanding the airman's toast—"Happy Landings!"

"So I shall always think of them as I saw them last—their number being sixty or so, and the average age twenty-two and a half, with the candle-light shining behind them, and their glasses raised."



THE FRENCH VOISIN TRIPLANE.

This design, which is a departure from orthodox practice, is interesting as showing that attention is being directed to the perfecting of the triplane, a type having certain advantages over the popular biplane. (*Photo. French official. Inset "Aerial Age."*)

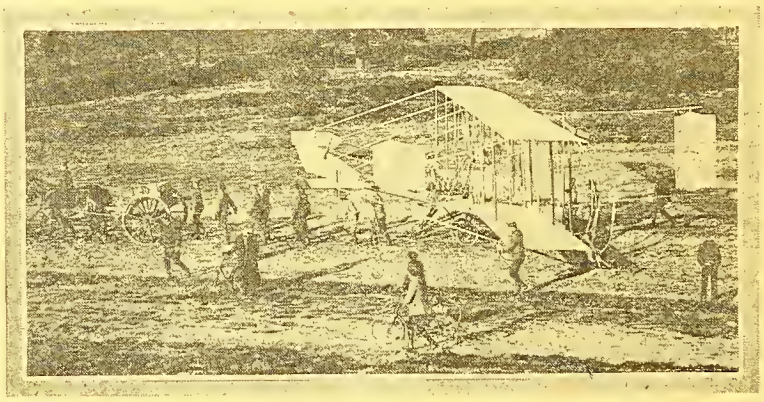
THE MAN WITH THE KITES.

A BRIEF RECORD OF CODY'S EXPERIMENTS IN AVIATION.

SAMUEL FRANKLIN CODY was born in 1861 in Texas. He came to England about 1898, and for a while earned a living with a Wild West entertainment. It was inevitable that a man with his daring and dynamic force should be attracted by flying, and, after lengthy experiments with those man-lifting kites that were the laughing stock of beholders ignorant of their utility and efficiency, he turned to the heavier-than-air machine, having previously made some experiments with the first successful dirigible balloon, the *Nulli Secundus*.

In 1910 he took his aviator's certificate, No. 9 granted by the Royal Aero Club.

For a decade he rendered faithful service, the value of which can never be measured, to the cause of aviation, and his first biplane was built while he was still experimenting with balloons. It had an elevator in front, and the 50 h.p. eight-cylinder Antoinette motor (which was taken out of a dirigible) drove two propellers. In September of 1908 he piloted the machine for the first time, more with the object of testing its balance than of making a proper flight. The weight was found to be too far forward, and the machine was slightly damaged on landing.



Cody's British Army Flier at Farnborough in 1909. This 'plane was powered with an eight-cylinder Antoinette of 50 h.p., and was one of Cody's earliest successful efforts.

Two months later the same machine, partially reconstructed, flew some two hundred feet with ease, and made a perfect landing. Cody fitted larger propellers, and on a further trial the machine flew easily for a quarter of a mile, clearing a clump of trees. An unfortunate attempt at a sharp turn brought the 'plane to the ground. It was rather badly smashed, but the quarter mile had been covered in twenty-seven seconds, and, barring an extremely short flight by Sir Hiram Maxim in 1894, this was the first public flight made in England.

Patiently the battered machine was made over again, and late in January of the next year it left the ground once more, the long streamers (which had been attached to the trailing edge of the 'planes to give some idea of the wind currents) fluttering gaily. These may be seen in the photograph. It flew for about three hundred yards, but made a forced landing owing to the rather restricted space.

A great deal of fun was poked at the pioneer about this time, but, as was pertinently remarked, the French experimenters were by no means immune from accidents themselves, and experience in aviation is not gained from a few short flights, nor is a perfect machine evolved in a day.

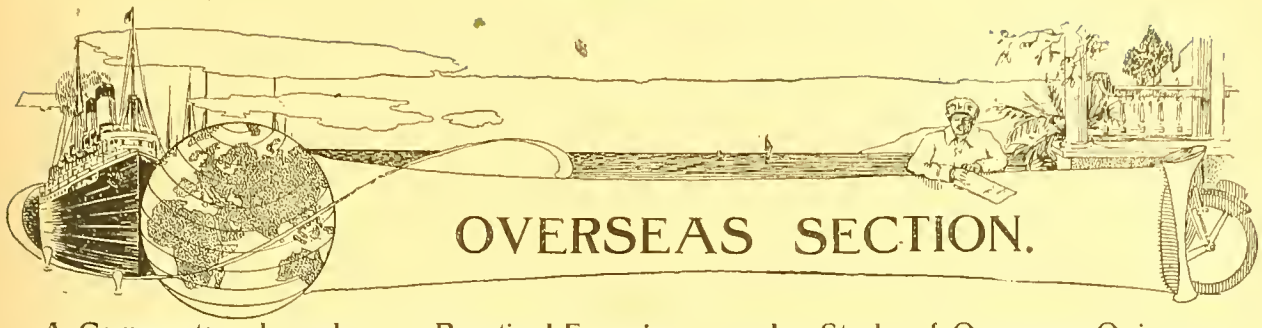
Matters progressed, and Cody gained experience both in regard to the handling and the improvement of his cumbrous machine.

In 1909 he flew for an hour and three minutes over Laffans Plain, covering forty miles. This was at a time when no other British pilot had flown a mile on a British machine. He gave passenger flights, and started work (as usual, years before the time) on an automatic stabiliser.

In December of 1910 he won the Michelin prize for a flight of 185 miles across country. In 1911 he won another Michelin prize, covering no less than 261½ miles. With the help of his son, he built a leviathan machine (nicknamed "the Cathedral"), which, with a 120 h.p. Austro-Daimler engine, often bore him to victory. In all, he built six biplanes and a monoplane. He was always a believer in the future of the big machine, and he projected craft similar to the modern Handley-Page at a time when it seemed ridiculous. Single-handed, and by sheer ability and pluck, he beat the best trained brains in the country, for he never flew by logarithms, and was practical above all things.

On August 7th, 1913, he was aloft with a passenger in his 100 h.p. biplane over Farnborough. At two hundred feet he started to *volplane* down. The planes opened upwards, as a drowning man throws up his arms, and the great machine fell like a stone, breaking its back. Pilot and passenger were thrown out in mid-air, falling thirty yards away from the wreck. Both were killed instantly. R.H.B.

There is, perhaps, no more precarious joy than handling a glider. A matter of ten years ago the writer and another madman, fired by the accounts of early experiments in aviation, built a real man's size glider modelled on Stringfellow's production of 1868. We had followed the plucky inventor's lines as closely as our means permitted, feeling that they were practicable, and after some hazardous months succeeded in accomplishing very fair glides. That we did not do better was probably attributable to the great difficulty of keeping the fabric taut. It was always a solemn moment before you launched yourself! Contusions innumerable, some indicative experience, and a great deal of fun, were what we got out of it. B.



OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinons.

The Comfortable Americans.

One feature of the big Yanks which to my mind accounts for much of their popularity is frequently ignored. In a recent discussion the main reference to comfort was the accusation that the big Yanks are terrible leg grillers when they are climbing hard and long. On the credit side of the balance they are usually smoother running than British singles. The exact details vary, but I reflect that I dislike one Britisher because it weighs too little and jumps about too much: another because it has a particularly stiff frame, and a "dud" fork: two more because their engines are rough.

Comparing the above quartette with the American machines, I can make no parallel accusations. They are all heavy and sit down well on the road. Their huge engines seldom ask for much throttle, and at moderate throttle openings you hardly know the engine is there. They have big back tyres, and very often rear springing as well. Their front forks afford excellent insulation (though they usually wear like the sole of a war-time boot). The average buyer is sensuous and innocent. He spots the superior comfort of the Yank: but he does not immediately realise the shortcomings which balance their comfort, though he probably will do so in time.

♔ ♔ ♔

What about Appearance?

Some years ago a fit of bile caused me to dip my pen in wormwood, and discourse about the hideousness of American motor bicycles of that age. I likened their outlines to misbegotten dromedaries, and their colour schemes to the crude æstheticism of the Post Office. Now my remarks recoil, boomerang-wise, on my own pate. A mild and genial importer sends me a cut of one of the latest post-war British models. He has taken a straight-edge and a penful of red ink, and has criss-crossed it with scarlet lines following the axis of every tube and part in the design. He adds but one solitary remark, "Surely a Cubist hath done this!" I can only cry "*Touché!*" I marvel much that none of those gentry to whom a flat twin is as Wilson to the Kaiser have commented on the evil part which the horizontal engine has played in spoiling the proportion and shapeliness of our machines. There is to my mind no question but that mechanical considerations have squeezed the artistic faculties out of many of our designers during the last year or two; and I can only plead that at our very worst we are not quite so bad as the Yankees, considering fairly wide averages, were a few years ago.

Post-war Petrol.

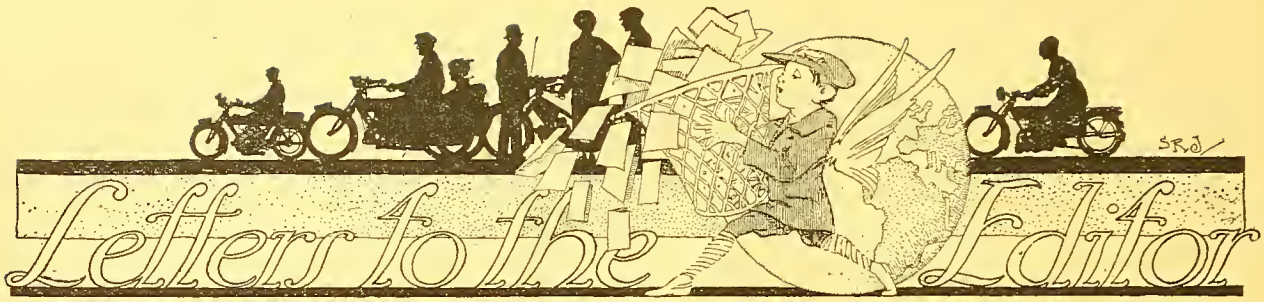
The most alarming rumours are current about the quality of post-war petrol. American engine designers are plainly redesigning their power units for the employment of fuels barely distinguishable from white oils, paraffin, and other liquids which we should have dubbed by the name of "substitutes" in those harassed days when our petrol was taken from us, and the embargo had not yet been imposed on "Binks" spirit and other sluggish juices. The American engineers seem to have two remedies in view. The first is intended to facilitate cold starts, and takes the form of an electrical heating apparatus in the mixing chamber or induction pipe; the second is planned to vaporise the heavier elements of the fuel when the engine is warmed up and the lighter elements are normally vaporised by such heat as the engine provides and the velocity of the mixture stream. A common provision consists of a bend in the induction pipe: opposite this bend a thin partition separates the induction pipe from the exhaust manifold, the two being cast as one. The drops of heavy liquid are stubbed against this partition, which is glowing with heat, and thereby vaporised.

♔ ♔ ♔

An Amusing Correspondence.

A Japanese reader has forwarded me an intensely humorous *dossier*, consisting of a triangular correspondence between himself and two tyre companies, whom we will call A and B. The reader sent an endless inner tube, manufactured by A, to be converted into a butt-ender by B, whose type of butt he admired. B's staff apparently forgot that, as the ends of a butted tube tuck inside each other, it was necessary to lengthen the tube by means of a 4in. sleeve before vulcanising on the butts: at any rate, when our reader received his tube in far Japan, it was several inches too short. Being a persistent man, he attempted to obtain pecuniary or other satisfaction from B, and incidentally A got drawn into the business, as B mildly suggested that A's manufacturing methods might allow an occasional tube to come out inches short. The efforts of A and B to disclaim liability, and to throw the blame on each other without incurring a libel action, are amusing—to a spectator. The incident reminds me of how I once failed to procure a 26in. tube during roadside tyre troubles, and ordered the local repairer to cut down a 28in. tube to fit my wheel. He removed 2in. from the joint, and grew quite abusive until I explained to him the reason why a 28in.-2in. tube was still between 4in. and 5in. too long for a 26in. wheel.

IXION.



The Editor does not hold himself responsible for the opinions of his correspondents

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

FRONT BRAKES.

Sir,—A few weeks ago a correspondent wrote that he was getting entire satisfaction from his front (belt) rim brake. I should be much obliged to him if he will say how he manages it. I have tried all adjustments, and find mine absolutely useless. I think it is an improvement on the old pattern, as it is not dangerous. W.H.M.

Stoke-on-Trent.

ONE-LEVER CARBURETTERS.

Sir,—We notice that you have been writing on the subject of one-lever carburetters. As we are just completing a new design of motor cycle fitted with the Tilston two-stroke engine and transmission, we are prepared to consider adopting and experimenting with a new carburetter fitted with one lever. At the same time, we shall be glad if you will inform your readers that we are also prepared to consider an efficient silencer. TILSTON ENGINES, LTD.

A CAUSE OF KNOCKING.

Sir,—I feel rather disappointed that more effort has not been made to run motor cycles on hydrogen. Why must we make our gas as we go along? I suggest a gas bag, and use hydrogen instead of coal gas. The job is getting it filled. I wish someone would be kind enough to tell me how to fill it.

You will remember I wrote you for your opinion as to the cause of knocking and vibration on my 4 h.p. Norton. It may interest you to know that the new piston was slightly longer than the old one, causing it to catch the crank case flanges on its downward journey. The troubles have disappeared on the piston being made $\frac{1}{16}$in. shorter.

S. BISHOP.

PROPOSED MOTOR TRADE TRAVELLERS' ASSOCIATION.

Sir,—I cannot understand why your correspondent, Mr. Jas. V. Abbott, should imagine it is necessary to organise a separate commercial travellers' association for the motor trade when there exists an excellent association for all branches of trade in the "United Kingdom Commercial Travellers' Association." This society has branches all over the kingdom, has been established many years, and has already in its membership a very large number of commercial travellers who represent firms in the motor and cycle trades.

Then there is the "Cycle and Motor Trades' Benevolent Fund," membership of which is open to anyone engaged in the motor or cycle trade.

Surely it would be better for those who are not members of either association to join one or both the above than to attempt to organise a fresh one, particularly during the war.

Coventry. TRAVELLER.

PETROL FOR SOLDIERS ON LEAVE.

Sir,—A short time ago I had the luck to be granted leave from France, and, following the instructions of *The Motor Cycle*, I went in search of "petrol for soldiers on leave." To "catch" the offices I had to stop one night and half the next day in London; but I had the reward, the reward I had been looking forward to for twelve long months, viz., that of buying two whole gallons of petrol (six, I am told, if I had been an officer; why, I do not know), of paying £1 for a new licence on the motor bicycle, 5s. driving licence, 1s. tax on petrol, and 7s. 4d. the price of petrol; total, £1 13s. 4d., with extras. Total mileage, 140. Therefore, through the medium of your most excellent paper, which I get sent out here each week, I hope to warn many of the boys going across that "petrol for soldiers on leave" may be better left alone. BALMORAL.

B.E.F.

[We think that, in the case of soldiers on leave, the Inland Revenue authorities might well forego the local taxation licence.—ED.]

COMPRESSED COAL GAS FOR COMMERCIAL VEHICLES.

Sir,—As announced in the press by the Gas Traction Committee, the necessary authority has been obtained to conduct trials with twenty goods-carrying commercial motor vehicles and 'buses equipped to run on compressed coal gas in the Metropolitan area.

Messrs. Flugel and Co., Ltd., of Green Lanes, London, N., recently applied under Section 17 of the interim report of the Gas Traction Committee

> "Metal cylinders. It is desirable to encourage forthwith, under special licence from the Board of Trade where necessary, a limited number of experiments on a commercial scale with compressed gas in rigid metal cylinders, plain or wire-bound, at pressures up to at least 1,800 lb. (120 atmospheres) on the square inch, in connection more particularly with certain of the larger motor omnibus undertakings and the transport departments of certain of the more important municipal authorities, in order to obtain data for dealing with this post-war development,"

for the assistance of the committee in respect of priority and such other facilities as may prove to be necessary to enable them to carry out the essential work in connection with the equipment of goods-carrying commercial motors running on compressed gas in steel cylinders.

The Gas Traction Committee indicate their approval of Messrs. Flugel's scheme for the adoption of compressed gas, and are willing to grant them or each of their approved clients a special gas permit for 250,000 cubic feet of gas (the equivalent of 1,000 gallons of petrol) per annum for each such goods-carrying commercial motor vehicle, such gas to be compressed and carried on the vehicles in steel cylinders at 80 atmospheres pressure.

No petrol will be withdrawn from the existing licence for one month after putting the compressed gas vehicle on the road, but after that period one-third of the petrol allowance for that particular vehicle will be withdrawn in exchange for 250,000 cubic feet of gas. For instance, if the existing licence for a particular lorry was sixty gallons per month, twenty gallons of petrol would have to be given up in exchange for the monthly gas equivalent of eighty-three gallons, a clear gain of the equivalent of over sixty gallons of petrol per month—a most valuable concession to anyone whose mileage is at present restricted by shortage of fuel.

This unique opportunity must be seized at once, as only a limited number of such special permits will be issued at present.

Any of your readers owning one or more goods-carrying commercial motor vehicles wishing to increase his mileage as aforesaid should put himself immediately in communication with Messrs. Flugel and Co., Ltd., of 35a, Green Lanes, London, N., to be included in their scheme for bringing into service commercial motor vehicles running on compressed coal gas in steel cylinders, the approval of which is indicated by the Gas Traction Committee.

FLUGEL AND CO., LTD.

THE DATE OF SECOND-HAND MOTOR CYCLES.

Sir,—We notice in a recent issue of your paper an advertisement of a 1916 two-speed clutch model two-stroke Clyno, and would like to point out to you that no Clyno two-stroke machines were manufactured in that year, and even in 1915 only three machines of this type left these works.

It may also interest you to know that all 6 h.p. two-speed Clyno motor cycles were manufactured in the year 1912 or earlier, as after this date we changed our design, and thence onwards have always fitted a three-speed car type gear box.

Numerous cases have come to our notice of motorists purchasing our machines as 1914 models, when they were actually 1912.

We would like to make it known to all motor cyclists that we are always willing, and in fact delighted, to help them in any way when they contemplate purchasing a second-hand machine, by notifying them of the date on which this machine left our works, if they will, before purchasing, communicate to us the number which they will find stamped on the timing gear cover of the engine.

THE CLYNO ENGINEERING CO.

A POINTED QUESTION.

Sir,—Having observed the letter from "A Regular Despatch Rider" and his uncouth reference to the A.C.U. M.M.D., may I encroach on your valuable space to enlighten his impertinent curiosity, which coming from a soldier is a poor example of his patriotism.

The A.C.U. M.M.D. is performing a very urgent and responsible duty in all weathers in connection with the Royal Automobile Club War Service, under authority of the War Office. What your critic can see "ludicrous" in this I fail to see, and it may be news to him that some of the messengers have seen service as regular despatch riders on all the fronts, and bear honourable scars.

The uniform he mentions is that of a R.A.C. owner-driver. It is provided at our own expense, and not at the expense of the Government. We are asked to provide a uniform (and not to reason why) in the same manner as special constables, Red Cross, and V.A.D. workers, and we have done it without regard to "swank" or whatever he means.

We do not wish to "show off" but to remind our curious friend (?) that it would open his eyes more if he knew to what expense some of us have had to go in order to keep going and carry on without delay in our messages. If he is familar with London thoroughfares as they exist to-day he must know how wonderful it is that our mounts stand up to the work.

Our services and machines are given voluntarily and ungrudgingly. We have no time to swank; but some of us would like "Regular Despatch Rider" to identify himself more openly and not hide behind a vague *non-de-plume*.

A.C.U. M.M.D., No. 42.

LONG STROKE ENGINES.

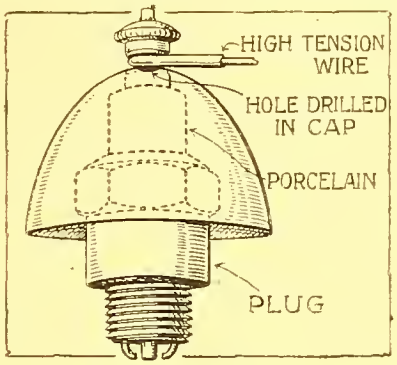
Sir,—I feel inclined to take exception to "Chinook's" statement that I take one long stroke engine of superlative merit and compare it with short strokes in general. In any discussion on the stroke-bore ratio the Norton's unique position naturally introduces it frequently, but what I tried to do was to show that in practically every representative class of motor cycle from 250 c.c. to 1,000 c.c. engine capacity the long stroke type engine, by its general performance, completely outclasses the short stroke engine of similar capacity.

Against his claim that I lay too much stress on the long stroke to the exclusion of all other factors such as cam contours and timing, I would like to point out the sudden and remarkable improvement in performance that some makers have obtained from adoption of the long stroke principle. To give a concrete example, consider the Triumph T.T. engine. For over seven or eight years this firm had been producing approximately square engines, and one may assume that the designers responsible knew all there was to be known of the various factors that go to make a successful short stroke engine. The firm produces a long stroke engine, and this product of their long stroke novitiate proceeds to surpass completely their short stroke speciality of years! "Chinook" would have us believe that the cam contours and timing are primarily responsible for this. If so it is a curious coincidence. I am glad he saves the 3½ T.T. Norton from the butcher's boy, as my personal impression has always been that the long stroke engine is a scientific treat to drive, whilst the short stroke low geared sowing machine type of engine should be reserved for one's dotage. Active Service must be making "Chinook" careless, *vide* his concluding paragraph: "He does not worry about the stroke-bore ratio because he cannot see it." Precisely why he worries about obtaining *perfect balance* and *good torque*, which I am certain he cannot see, he does not explain.

A. LINDSAY, Capt. R.A.F. (Medical).

PROTECTING THE PLUGS.

Sir,—Many motor cyclists at times during wet weather must have experienced trouble through the rain or mud shorting the current on the plugs. This is often the case with the Douglas machines in use out here, especially the lightweight 2¾ h.p. After having started at 6 a.m. the other day in order to arrive at the Brigade H.Q. by seven o'clock promptly, I found it took me nearly all my time to get along at all (the rain was simply pouring down in torrents), the engine missing first on one cylinder and then the other, until the engine would finally stop altogether.



See letter, "D.R., R.G.A."

After having arrived back in the battery position I decided to get to work and find some remedy for this trifling fault in an otherwise fast, reliable, and sound little mount. Not far away from us is an old R.F.A. ammunition dump, and among this assortment of empty shell cases, etc., were a number of brass nose caps, which fit over the fuse of the shrapnel shells. Taking a couple of these back, I drilled a hole in the cap of each, and fitting them over the terminals of the plug, afterwards putting on the high-tension wire and tightening the whole lot up with the terminal nuts, find they answer the purpose splendidly.

I have been out in quite as severe weather lately, and find the engine never "misses" now.

Do you think this tip would be of use to any of your readers? Attached is the sketch of the caps in question.

Both the Triumph and the Douglas stick up to these awful roads splendidly, and opinions are fairly equal regarding which machine is the better mount. Personally, I prefer the heavy single.

D.R., R.G.A.

ELECTRIC LIGHTING.

Sir,—The subject of electric lighting for motor cycles is one of increasing interest, and many of your readers, I imagine, would be glad to have further particulars of the ingenious magneto conversion by Lt. C. S. Burney, described on page 33 of your issue of July 11th.

Such a conversion is a small ambition of my own, to be carried out "when this (censored) war is over." I propose to use a 180° twin magneto, rewinding the armature and converting the distributer into a commutator in order to provide a unidirectional current for charging. The contact breaker would be entirely changed, and used as a centrifugal cut-in to provide against discharge of accumulator through the generator below a critical speed.

But is it worth the trouble? Lt. Burney appears to be able to light one lamp only, and yet there are on the market lighting sets for two lamps driven off the ordinary magneto, which at the same time is fulfilling its ignition functions. Lt. Burney's apparatus appears, from the photograph given, to be driven, moreover, at about two and a half times engine speed, *i.e.*, five times the normal speed of a magneto, and that for, *apparently*, no better result than is to be attained by far simpler means.

Fritz has interfered with many pre-war dreams of most of us, and I have not yet driven my electrically-lit outfit. Such, alas! is no part of an infantryman's equipment! But I dream, and from my dreams and a few rough sketches made from time to time I fondly hope I may evolve perfection.

A. N. NELSON (Cpl.).

SERVICE—GOOD AND BAD.

Sir,—In a recent issue I noticed someone writing about blacklisting, and it occurred to me that the experiences obtained in the past year might be at least interesting to your readers.

About a year ago I needed some odd parts for a certain lamp which I was sorting up prior to selling my machine, and communicated with the makers, who delayed replying, and then misunderstood me: sent *pro formâ* invoices and so on till I was heartily sick of them, and got along on good enough makeshifts. Several people have complained of similar treatment.

My next machine had lamps of a well-known firm fitted. One of the generators was badly knocked about, and was sent to the makers for overhauls. It was returned in a few days, and the account came next day. Needless to say, it was paid by return post.

All the plug firms—Lodge, Sphinx, and Forward Co.—have shown me the greatest courtesy in the way of sending on repaired plugs, etc., without first sending *pro formâ*.

Messrs. Cooper-Stewart Co., whom some time ago you brought to my notice, is an excellent firm, and not in the same boat with another firm about whom I had to complain to you regarding repairs to a cracked piston.

In conclusion, the middle line appears to be struck by the makers of my cycle, who send an invoice, and state that the goods are being sent off, and request remittance per return. From the delay, however, and comparison of dates of posting, it is obvious that they wait till they get the "siller" in their hand. This is not so blatant.

I have been an old reader of your journal, even in the days when in France, and nothing doing but tramping out and in the line. W.B., CAPT. R.A.M.C.

RICHTHOFEN'S DIARY.

Sir,—In your issue of July 11th appears a singularly narrow-minded epistle from one, Geo. T. Waddington, on the subject of the late Cavalry Capt. Baron von Richthofen's diary. Goodness knows I am no supporter of the German people as a whole, but let us at least be fair to a fallen foe—a foe who was universally respected and admired by the Royal Air Force, as one of the few Hun airmen who "played the game."

Your correspondent quotes passages from his diary such as: "The British are foolhardy and inexpert": "the French are cowards and given to shady tricks." Apparently, he attributes these remarks to Richthofen's pen. If he had read the review contributed by "Torque" more carefully he might have seen that the book, in passing through the hands of German editors, was altered considerably, possibly for propaganda purposes.

Naturally they (the editors) would wish the British and French flying services to appear as degraded as possible.

Von Richthofen was a sportsman and a gentleman, in my opinion, and I shall continue to hold that opinion in face of whatever criticism this letter may bring forth. Surely the Air Service is the one section of the public which can form a real opinion of Richthofen as a sportsman, and the Air Force, almost to a man, regretted the death of von Richthofen, who had, in their opinion, as I remarked before, played the game.

Your correspondent further hopes that "Torque," if he is a Britisher, will be ashamed of himself "for attempting to glorify the filthy Hun." In return, I might ask G. T. Waddington whether it is a British habit to heap insults on a fallen foe? JACOBUS (Late R.F.C.)

Sir,—I was very much struck by Mr. Geo. T. Waddington's letter in your issue of July 11th on the "appreciation" of Richthofen's diary.

I am not a pro-German, but I am a member of the R.A.F., and have not heard during my two years' service any such violent opinions as Mr. Waddington expresses.

Richthofen may not have been a "sportsman" in the English sense of the word, but he was not afraid, and I take it to be un-English to call him "filthy" because he was a Hun.

It was partly the prevalence of precisely this spirit in both England and Germany that led to the war, and the survival of which will postpone the advent of peace.

We are out to fight the Germans until they accept President Wilson's terms, and after that I suppose we are going to live in the same world with them.

Is Richthofen "filthy" because he led at least one of the "baby-killing raids on London"? Mr. Waddington must surely be aware that we inevitably kill babies occasionally in our raids on the Rhine towns.

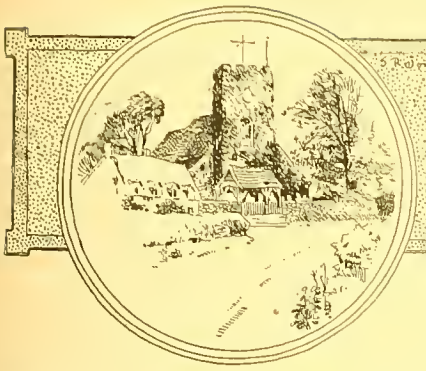
I am not justifying the Germans; they must bear the blame of having started this thing. Our daylight raids are not the same as those of the Germans, but they are not *totally* different—bombs cannot always hit the right target.

In a word I plead for a little more broad-mindedness.

Hatred and malice will not get us anywhere. They have got to be eliminated before the League of Nations can come and the world be a place fit to live in.

H. GREEN, R.A.F.

An American Emblem twin, equipped to carry a family of four. The forward seats are arranged side by side; behind are two smaller seats placed back to back. Needless to say, we do not advocate this economical method of motoring. Surely the cost of the four seats and special fittings could not be very much less than that of a sidecar, and this method of travel would be infinitely more dangerous and uncomfortable.



PETROL: Crimes and Comments.

Although the facts, information, and advice contained in this article are presented in a somewhat unorthodox manner, they are alike sound and authentic.

FIRST of all the address of the Petrol Controller is 19, Berkeley Street, London. W.1, and all applications for petrol licences should be sent to him. Secondly, a motor car or motor cycle may be used for certain purposes without special permission and the possession of a current petrol licence has nothing to do with the legality of the use of a motor vehicle under any circumstances. The policeman has no right to demand a sight of the petrol licence.

At the outset let me point out that any liquid capable of being used as a fuel is petrol within the meaning of the Act. So far as the legal aspects of its use in a motor are concerned, there is no difference between petrol or paraffin or brandy.

The purposes for which you may use a motor without any special permit are as follow: (1.) Work of national importance. (2.) Necessary household affairs. (3.) Medical service. (4.) Journeys to and from a railway station—and all these under the proviso that no other means of conveyance is reasonably convenient.

And that's where they have you!

The interpretation put upon those lovely words "reasonably convenient" by some magistrates baffles description, let alone explanation. A Birmingham munition worker who finished work at 5 a.m., and who lived six miles away from the factory, used his motor cycle to travel home. He was caught and mulcted of some £5 because, if he had waited for two hours the tram service would have started and he could have gone home on the tram. The tram journey took about one and a half hours, while the motor cycle enabled him to get home in twenty minutes. On the whole, by using his machine he would be home no less than three hours earlier than if he went by tram, to say nothing of having to wait about for two hours in the early hours of the morning. This case was heard last December.

Passengers and Soldiers on Leave.

It must not, however, be thought that the words "reasonably convenient" are always dragged into the case. For instance, in one case at Birmingham some time ago—about last November—one car was stopped and the passengers in it fined! And this in spite of the fact that the Petrol Controller has definitely stated that the carriage of passengers has nothing to do with any case. If the petrol is being used legally the car may contain as many passengers as it will hold or none at all, and not only are the passengers free from any responsibility, but they have nothing whatever to do with the matter. This, of course, refers to passengers other than the owner or driver of the car.

One of the few people who may use a motor without restriction is the soldier on leave after service Overseas or from hospital, yet in Coventry on Thursday, 11th inst., a soldier was fined £1 for using his motor cycle, although he was on leave from the Front and was returning the day after the case was heard!

At Merthyr Tydvil a week or so earlier another case was heard. A motorist had business in this town. He went in his car, and on the way he overtook some pedestrians, to whom he gave a lift. He was stopped, and because his journey seemed allowable, even to the policeman's comprehension, he was attacked *via* his passengers. When the motorist appeared before the Bench the case was dismissed on payment of the costs, with a caution! Caution of what? Give it up.

To Coventry we must turn for the crowning instance. It is an instance that explains such a lot in the domestic history of Coventry. On that very day when its city fathers fined a soldier £1 for the illegal use of petrol, which was probably quite legal, they dismissed the case against two parents for alleged ill-treatment of their child, putting the fault down to ignorance rather than censorible motives. You can be ignorant in Coventry, then. Perhaps this is just as well, for if ignorance were an offence in this ancient city—why even its present crowd of specials would find their hands full. And phew! what a gaol!

So just listen to this. A discharged soldier has two jobs; one is the testing of War Office motor cycles made by a Coventry firm (he is employed by the firm and not by the W.O.) and the other is running two businesses at a place called Coalville—a village in Leicestershire some twenty-four miles in a straight line from the enlightened city. The business at Coalville is a motor repairing concern, and is run by this discharged soldier in partnership with his brother, who is still in the army, so that to all intents and purposes the business may be regarded as a one-man affair

Trains and Convenience.

Every week-end the afore-mentioned soldier has for the last seven years—excepting only the time he was himself in the army—travelled from Coventry to Coalville and back by motor cycle. Was not this too much of a good thing? Certainly the police and their friends thought so, and made up their minds it must stop—taking such risks over winning the war was really past a joke. Opportunity, too, does not knock at every man's door more than once.

Petrol : Crimes and Comments.

A little masterly detective work revealed to the police the astounding fact that there was a train to Coalville from Coventry on Saturday afternoon, and a train, at that, which did the journey in no more than two hours. As for getting back to work on Monday morning, there was a train from Coalville at 6.30 p.m. on Sunday which landed its passengers at Coventry no later than midnight. The first train on Monday morning arrived at about 10 a.m., and the victim had to be at work by 6 a.m. or lose the whole morning. What more convenient or desirable?

On June 15th—a Saturday—the tester was stopped on his ordinary testing run by a cordon of police guarding the town, and so he knew of the dangers afloat on that particular day. Nevertheless he thought that the journey to Coalville was a necessary and pardonable one within the meaning of the Act, and so he risked it in the afternoon.

He was fined £1.

The solicitor who took the case under instruction from the A.C.U. considered the conviction most unjust; the magistrates gave no reason for their decision, and he advised the defendant and the A.C.U. that a good case lay for appeal.

"We won't play in your Yard."

Now notice what a solid and united front the motoring community is capable of presenting in the face of danger! The A.C.U. communicated with the man's employers, and asked them if they would take any share or manifest any interest in lodging an appeal, as the case was one of some importance. The employers replied that, as the offence was committed in the man's own time and on his own machine, it did not concern them, and they could take no action!

Good, now said the A.C.U., you will not help us, why should we worry over your troubles or those of your employees? And we won't! And so the appeal, foredoomed to success, was never made.

Summing Up of the Present Situation.

The present situation in the petrol world may be summed up as follows: If the petrol was purchased before the restrictions were introduced—*i.e.*, before July, 1916—a permit must be obtained before it can be used. This permit is nearly always granted.

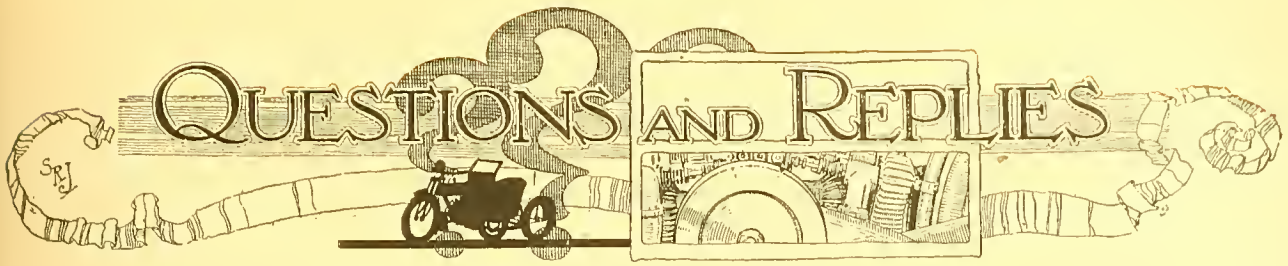
If the petrol was obtained by means of a licence—*i.e.*, if its purchase was entered on a licence—it may be used without any special permit, and whether the licence under which it was purchased is current or not has nothing to do with the case.

Of course the vehicle may only be used for certain specified purposes (already enumerated). The foregoing conditions apply only so long as you are using the vehicle for one or more of these purposes. If you are deliberately using it for any other purpose, then the question as to how you obtained your fuel has even less to do with the case, and you are truly in a bad way.

Summing up in a few words, *you may use legally-obtained fuel for a legal purpose. Illegally obtained fuel may be used for no purpose whatever.*

RAMA

A young wild boar, the mascot of a detachment of American despatch riders. By the side of an Indian motor cycle are the two D.R.'s who captured the little animal.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects

Breaking Exhaust Valve.

I have a J.A.P. engine which is continually breaking the exhaust valve. I should be glad if you could give the reason for this.—L.W.

If the valve is perfectly free in the guide and the spring is not too strong, the trouble is most likely due to faulty material in the valve itself, but as you say this has happened to several valves we should imagine faulty material is hardly the real explanation. It would perhaps be as well if you put your trouble before the makers of the engine.

Petrol for a Naval Friend.

Would you kindly let me know if it is legitimate for me to take a friend, who is a Naval man on leave, in my sidecar, or whether he would be required to drive the machine? I am shortly expecting this friend home, and would like to have some advice before taking out a licence for myself.—J.S.

If you are on a journey permissible under the latest Order, the fact of your carrying a passenger will make no difference to the question of the legality of your ride. If your friend is not a relative, the Petrol Controller would not be inclined to give him a petrol licence to use your machine.

Improving Old Models.

(1.) I have a 3½ h.p. Rex. It has not a silencer like the ordinary motor bicycle, but has a plate in the side of the cylinder held by four screws. I have had the engine to pieces, and find it has had very little wear. Would it pay to fit an exhaust pipe, silencer, and magneto, and could you tell me in what year it was made? (2.) I have another motor bicycle (2½ h.p.), but do not know the maker. It has only got an "S" on the crank case. It appears to be a newer type than the Rex. Could you also tell me what year it was made, and would this also pay to have a magneto fitted? Both these machines have accumulator ignition.—E.H.C.

(1.) Yes, it would be worth while fitting an exhaust pipe and silencer, and this could be done quite easily. The date of the machine is probably 1903 or 1904. (2.) The engine is a Sarolea, and is of Belgian manufacture. It was probably made about the same time as the 3½ h.p. Rex. If you could get two magnetos cheaply it would be worth while fitting one to each.

Leaky Valve Caps.

I am unable to retain gas-tight joints at the valve caps. You are aware of the method of tightening by a peg spanner and recesses in valve cap. I cannot get a good grip before the spanner jumps out. (1.) Could you inform me if there is a valve cap of another make that is interchangeable with the Ariel, single-cylinder, having a hexagon top for the spanner? I have tried new washers and Rotary jointing paste, without success. (2.) Is there any method you could suggest for making gas-tight joints?—J.C.

(1.) We think it is very improbable that you will be able to get interchangeable valve caps. Your trouble obviously lies in faulty facing, either under the rim of the cap or on the top of the cylinder. (2.) You do not say if you have tried asbestos string. This is often successful.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Removing a J.A.P. Timing Pinion.

I am overhauling my 1914 8 h.p. J.A.P. engine, and should be obliged if you would kindly tell me: (1.) How to remove the timing pinion wheel. (2.) Is there a special tool required for the job? (3.) If so, can I buy it, and from whom? (4.) What is a good thing with which to clean the aluminium crank case?—H.D.

(1.) The timing pinion is screwed on to a J.A.P. engine-shaft. (2.) A special tool is required, consisting of a tube in which there are a number of steel pins, which go between the teeth of the timing wheel. The wheel is then unscrewed in the same direction as that in which it normally rotates. (3.) You could probably get one from Messrs. J. A. Prestwich and Co., Northumberland Park, Tottenham, N. (4.) Scrub the crank case over with a file card or a fine wire brush dipped in clean paraffin.

Using Paraffin.

I own an 8 h.p. Chater-Lea motor cycle with J.A.P. engine, which I am thinking of running on a mixture of petrol and paraffin. (1.) What is the most satisfactory proportion in the mixture? The carburetter is a B. and B. adjustable jet. (2.) Should I be able to start easily from cold on the mixture? The engine, I may add, is a very easy starter on petrol. (3.) What mileage per gallon should I get? I have a sidecar, and shall carry a passenger. (4.) I suppose it would not affect the power appreciably? (5.) After about ten minutes' running I cannot bear my hand on either cylinder. Is this right? I give three pumpfuls of oil before starting. The crank case keeps quite cool. (6.) How is a chain connected up with an uneven number of links?—O.W.H.C.

(1.) The least possible amount of paraffin (2.) This is very unlikely, but it depends to a large extent on the actual proportion of the mixture. In any case, even assuming the proportion to be half and half, the injection of petrol into the cylinders should ensure fairly easy starting. (3.) About the same as with petrol. (4.) The power generated is theoretically greater, but as this leads to early knocking the available power output is considerably less. (5.) Yes. (6.) By means of a cranked link.

RECOMMENDED ROUTES.

STOCKTON TO RUGBY.—J.L.

Stockton, Yarm, Thirsk, Boroughbridge, Wetherby, Aberford, Ferrybridge, Doncaster, Worksop, Mansfield, Nottingham, Leicester, Lutterworth, Rugby.

CHELTENHAM TO KNUTSFORD.—G.H.L.

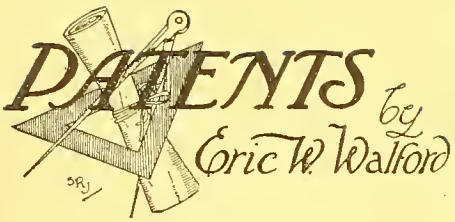
Cheltenham, Tewkesbury, Worcester, Kidderminster, Bridgnorth, Wellington, Whitchurch, Tarporley, Northwich, Knutsford.

SEVENOAKS TO BOGNOR.—W.P.

Sevenoaks, Edenbridge, Lingfield, Crawley, Horsham, Five Oaks, Billingshurst, Pulborough, Eastergate, Bognor. Approximately 65 miles.

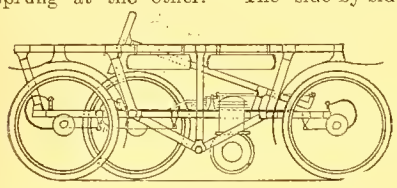
HARROGATE TO BOXMOOR.—N.W.M.

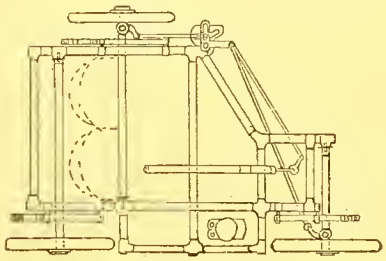
Harrogate, Wetherby, Aberford, Ferrybridge, Doncaster, Retford, Newark, Grantham, Stamford, Norman Cross, Eaton Socon, Biggleswade, Baldock, Stevenage, Welwyn, Hatfield, St. Albans, Boxmoor. Approximately 196 miles.



Three-wheel Sociable.

In this invention both front wheel and side wheels are deflectable for steering purposes, the remaining wheel being the driving wheel. Each wheel is independently sprung, being carried on an axle member pivoted at one end and sprung at the other. The side-by-side

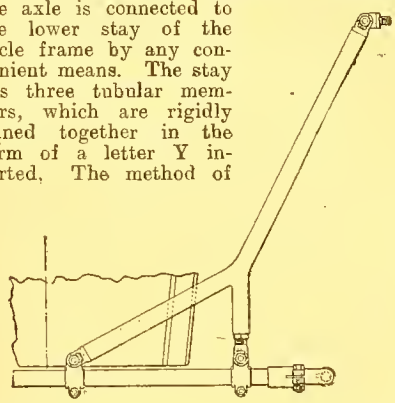




seats are placed between two longitudinal members of the frame at their rear or widest end. The two steering wheels are interconnected by rods and bell crank levers, while the engine is carried at the side in a position approximating to that of a sidecar combination.—R. R. Bertram, No. 108,732, 1917.

Improved Sidecar Connection.

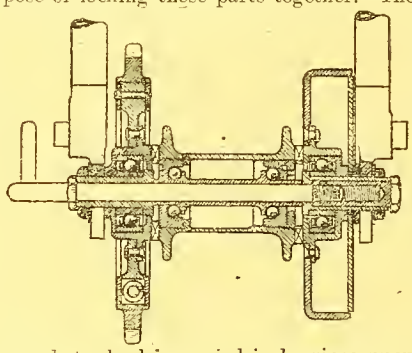
The subject of this patent is a sidecar rear stay connected with the axle of the sidecar and adapted at its upper end to be connected with the upper portion of the cycle frame. The inner end of the axle is connected to the lower stay of the cycle frame by any convenient means. The stay has three tubular members, which are rigidly joined together in the form of a letter Y inverted. The method of



connecting these members to the axle allows the stay to be turned about the axle for adjustment. The shorter member is shown to be adjustable as to length by means of a screwed shank provided with a locknut, thus providing for adjustment for the alignment. —S. C. Poole and T. W. A. Smith, Wolverhampton, No. 109,393.

Detachable and Interchangeable Wheel.

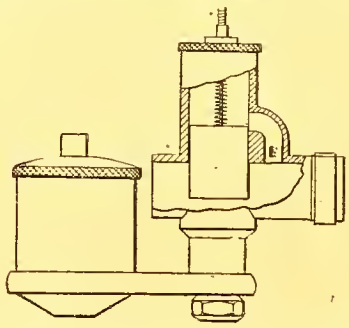
Chiefly this invention relates to that class of demountable wheel wherein a sprocket wheel or combination sprocket wheel and valve drum is mounted upon one side of a motor cycle frame, projections and recesses being provided upon the hub and sprocket wheel for the purpose of locking these parts together. The



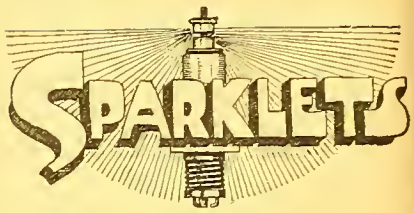
sprocket wheel is carried in bearings upon a sleeve, which is locked to the fork member of the machine, the valve drum being carried by a similar fixed sleeve on the other member of the fork. These two members have projections which register with recesses in the outer faces of the detachable hub member when the whole is locked up by a non-rotatable spindle passed through all three members. —W. F. Lechmere and the James Cycle Co., No. 115,204, 1918.

Carburetter.

This invention comprises a carburetter having a piston throttle adapted to control the main draught passage, which throttle is adapted to admit additional air. According to an arrangement, this addi-



tional air is admitted to the main draught passage from a space above the throttle or at the extremity of the throttle remote from that beyond which the jet occurs. This additional air does not pass over the jet, and it is proposed to regulate or cut off the said additional air by the movement of the throttle valve, the arrangement being such that when the throttle valve is in its nearly closed position for slow running this additional air is admitted to avoid the formation of a too rich mixture. As the throttle is opened the supply of additional air is automatically cut off. Several methods of attaining this end are included in the patent. —E. Hutchinson, No. 110,001.



A Good Year.

At the annual meeting of shareholders of C. Binks, Ltd., for the current year a dividend of 15% free of tax was declared.

The British Magneto.

A new edition has just been produced of an interesting booklet describing the works and methods of the makers of the all-British M-L magnetos. A copy will be sent post free to any reader who cares to apply to the M-L Magneto Syndicate, Ltd., Coventry.

Change of Address.

Letters concerning the sales of Clincher tyres should now be addressed to the North British Rubber Co., Ltd., 111/113, Great Titchfield Street, London, W.1, the export, advertising and hand tyre departments being located at 257/259, Oxford Street, W.1.

James Sidecar Twin.

The latest James motor cycle is a 5-6 h.p. twin designed for those who prefer a twin to a big single for sidecar use. This machine is priced at eighty guineas, and embodies the James three-speed gear and all-enclosed chain drive. The sidecar, of course, is an extra.

Spare Parts List.

An up-to-date spare parts list of the 8 h.p. model, with up to date prices, has recently been issued by New Imperial Cycles, Ltd., Princip Street, Birmingham. At the present time such a list is something of a rarity, and motor cyclists interested in this make of machine would do well to apply for a copy of the list from the makers.

Reviews.

"Steam Road Vehicles." Iliffe and Sons, Ltd., 20, Tudor Street, London, E.C.4. Post free, 3s. 10d. This is the first complete work of its kind, and will fill an undoubted need among drivers of steam waggons and tractors as a practical guide to these vehicles and the principles which govern their operation and successful use.

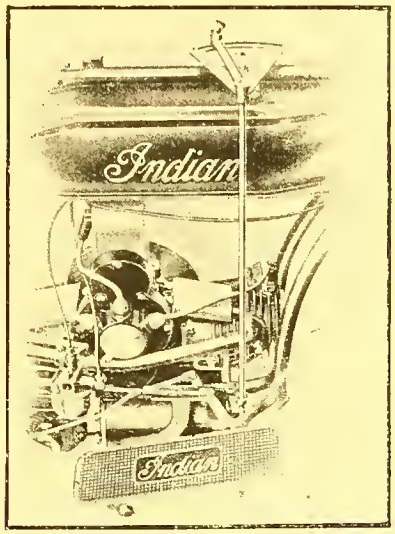
Of Interest to Maimed Soldiers.

Messrs. Alldays and Onions, Ltd., the makers of the Allon motor cycles, are producing a hand-propelled invalid tricycle, specially designed for the conveyance of soldiers who have lost either or both legs. The machine is constructed with a differentially-geared axle and single or two-speed gear. Special attention has been paid to easy running, so that the user can propel himself without undue exertion. A hand brake, operated by Bowden lever and a free wheel device, is provided, so that when released the machine can coast down descents or be pushed as a Bath chair. The makers' address is Matchless Works, Birmingham.

A FEATURE OF THE

1918 Indian LIGHT TWIN.

THE POWER PLANT AND GEAR CONTROL.

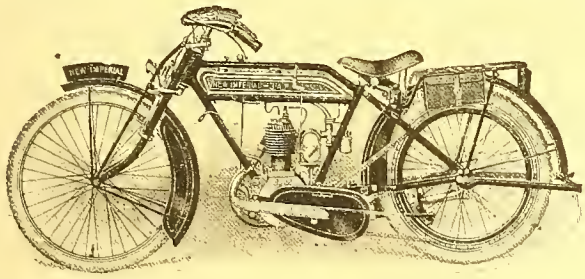


We regret that we are not in a position to supply motorcycles at the present time. But we can send 1918 descriptive list on application.

This applies to Great Britain only.

HENDEE MANUFACTURING CO.,
"Indian House," 366-368, Euston Road, London, N.W.
Telephone: Museum 1643.
Telegrams: "Hendian, Eusroad, London."
AUSTRALIA—109-113, Russell St., Melbourne.
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 579, West St., Durban; Indian House, Strand St., Port Elizabeth.

Smooth Running – makes for essential comfort and ease, with the maximum of economy of wearing parts. The "joy of the open road" is realised in an emphatic degree with the



New Imperial "Light Tourist"

because of minute attention to this valuable quality.

Made in Gent's and Lady's Models.

Two-speed and Clutch and Kick-starter, at pre-War value.

THE MACHINES CAN BE SUPPLIED FOR WORK OF NATIONAL IMPORTANCE.

NEW IMPERIAL CYCLES, LTD., BIRMINGHAM.

(Est. 30 years.)

MISCELLANEOUS ADVERTISEMENTS.

IMPORTANT NOTICE.

Owing to the August Holidays, the issue of "The Motor Cycle" for August 8th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, August 1st.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post

MOTOR CYCLES FOR SALE.

A.B.C.

A B.C., 1918 machine, fine condition, little used, spring frame, 4 speeds, nearly new sidecar, 4-point attachment; price £85.—Box 2,126, c/o *The Motor Cycle*. [X6425

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5359

1918 A.J.S. Combination, 6h.p., spare wheel, electric lighting, horn, speedometer, extra large lamps, oversize tyres, finished black and grey, unscratched and absolutely perfect.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

For New Machines

(Solo and Combinations)

AND FOR

Second-hand Machines

OF

AscertainedValue

THE SURE FIRM IS

GODFREY'S

By ascertained value we mean an intimate knowledge of the state of every working part by actual examination.

The external appearance of a machine you can judge yourself. But it is far from being a reliable guide to value.

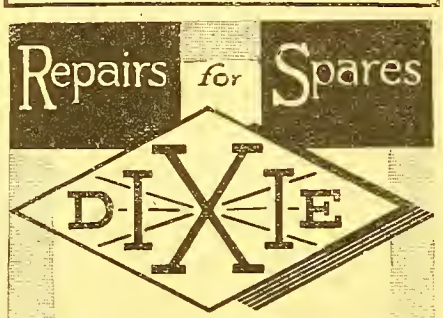
Write for full list of our stock of New and Second-hand Machines.

EXCHANGES. EASY TERMS.

GODFREY'S LTD.

208, Gt. Portland Street, LONDON, W.1.

'PHONE: 7091 MAYFAIR (2 Lines.



or Splitdorf magnetos go to the

MANUFACTURERS

Representatives. They know what is required. They have the most extensive stock of spares. Address:—

American Supplies Co. Ltd

162, Grt. Portland Street.

Phone: MAYFAIR 3258. LONDON. W. 1.

IN STOCK.

6 h.p. **James** Comb. **£104 0**

3½ h.p. 3-sp. **Rover £80 0**

3½ h.p. T.T. **Rover £62 10**

Send for our Lists.

THE NORTH WALES MOTOR EXCHANGE, — WREXHAM. —

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. 1915 6h.p. Combination, hood, screen, and accessories; £79/10.—Motor Exchange, Horton St., Halifax. [6921

A.J.S.—Immediate delivery of Military Model, 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

A.J.S.—We have six 1915 and 1916 A.J.S. combinations on offer. See our displayed advert., page 21.—Maudes', 100, Gt. Portland St., London, W.1. [6995

A.J.S. 1916 6h.p. Combination, complete, spare wheel, perfect running order; any test; little used, many spares; bargain, £84.—Townsend, Oundle, Northants. [X6427

LATE 1913 6h.p. A.J.S., with Mills-Fulford sidecar, in good condition, good lamps, speedometer, and all new tyres; price £55.—Apply, Webb, Bell Hill, Lydbrook, Glos. [6876

A.J.S., 1913-14, 2¾h.p., 2-speed, C.S. clutch, £35; 1914 3-speed and kick-starter, £42/10; 1914 6h.p. combination, £67/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [6620

A.J.S., 1914, 2¾h.p., 3-speed gear box, enclosed chain drive, K.S., B. and B. carburetter, Bosch mag., Pillion seat, P. and H. lamps, with all accessories and tools, in perfect condition; any trial; £52.—23, Chapel St., Ulverston. [X6433

A.J.S. 6h.p. 1914 Combination, with hood, screen, speedometer, 3-speed countershaft, 2 Lucas King of the Road lamp sets, Gloria A1 sidecar, all in tip-top condition; £65, or exchange modern higher powered combination.—176, High St., Harborne, Birmingham. [X6300

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4997

Alldays.

RIDER TROWARD'S, 31, High St., Hampstead.—Allon, new 1917, 2-stroke; 35 gns. (D) [7039

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

3½h.p. Ariel Combination, 1914 model, fitted with handsome coachbuilt sidecar, dustproof mag., countershaft, 3-speed gear, and clutch, and kick starter, all accessories, and speedometer, with several tools and spares; bargain, £60; guaranteed.—Wauchope's, 9, Shoe Lane, London. [7033

A.S.L.

A.S.L., 3½h.p. J.A.P., Gradd gear, Bosch mag.; £14/10.—Motor Exchange, Horton St., Halifax. [6923

Auto Motor.

AUTO Motor, 3½h.p., Bosch mag., good tyres; £7/10.—Collier's Motories, Deal St., Halifax. [6922

Auto-Wheels

RIDER TROWARD'S, 31, High St., Hampstead.—Auto-wheel, standard 1915; 7 gns. (D) [7046

AUTO-WHEEL, latest pattern, in perfect condition, little used; price £9/10.—136, Harrington Rd., S. Norwood, S.E.25. [6894

Bradbury.

RIDER TROWARD'S, 31, High St., Hampstead.—Bradbury, 1914, 4h.p., 3-speed, coachbuilt combination; 35 gns. (D) [7047

4h.p. Bradbury, 2-speed N.S.U. gear, very powerful and fast; any trial; will accept £20 for quick sale.—Palierman, High St., Bangor. [X6413

BRADBURY, 1914, 6h.p., and sidecar, £85; 1912-1913 3½h.p., 3 speeds, with coach sidecar, £32/10; 1913 3½h.p. 3-speed model, £29/10.—Collier's Motories, Deal St., Halifax. [6924

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

Advertising and Publishing Offices:
20, Tudor Street, London, E.C.4.
Telegrams: "Cyclist, Fleet, London."
Telephone: 2848 City (five lines).

Editorial Offices:
Hertford Street, Coventry.
Telegrams: "Motorcycle, Coventry."
Telephone: 10 Coventry (five lines).

Northern Offices:
199, Deansgate, Manchester.
Telegrams: "Iliffe, Manchester."
Telephone: 620 City.

Subscription Rates: Home, 15s. 2d.: all countries abroad, 19s. 6d. per annum.
The Foreign rates quoted above apply also to men in the Services abroad.

COLONIAL AND FOREIGN AGENTS:
UNITED STATES—The International News Agency, New York. CANADA—Toronto News Co., Ltd., Toronto; Montreal News Co., Ltd., Montreal; Winnipeg News Co., Winnipeg; British Columbia News Co., Vancouver; Gordon & Gotch, Ltd., 132, Bay Street, Toronto.
AUSTRALIA—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin. INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

The Politics of the Motor Cycle Industry.

IN every important industry at the present time a certain amount of hard thinking is being done on the question of constitutional reorganisation. The fundamental idea underlying these activities is that the workers, as well as the employers, should have a voice in the government of the industry as a whole, and should, to a certain extent, be officially advised of its policy and given an opportunity of expressing their opinions on it. In other words, industries are attempting to set up some sort of constitution on the lines suggested in the Whitley Report.

We are told that a paper constitution, or an inflexible constitution, is not a good means of government, but circumstances can alter cases, and when for some reason the ideal is impossible of attainment—in this particular case the ideal is the unwritten or flexible constitution—then artificial means must be resorted to, and the notion that they are necessarily foredoomed to failure must be kept in the background, so that they may be given every chance to work out in practice to the best advantage.

There is an idea afoot that the motor industry, although one of our newest great industries, is very conservative in its nature, and is not ready to adapt itself to new ideas and new methods of industrial organisation. This idea is, however, probably without any foundation in fact. Manufacturers in the motor industry are already thoroughly well organised, but while the manufacturer has found no difficulty in organising, the same does not apply to the worker. A motor manufacturer is a man with a trade essentially his own, but the worker, as such, comes under the much wider term of "Engineer." There is at present nothing like a union of workers engaged in the automobile industry, and the Manufacturers' Union is not likely to be over-anxious to accept on its council representatives of a much larger body, the Amalgamated Society of Engineers—an attitude on the part of manufacturers for which an excellent *apologia* may be maintained.

The difficulty, then, is how the workers are to be represented on the council. *The Autocar* is of the opinion that the first move must come from the employees themselves, and must take the form of a society or body consisting of automobile workers only. It is, of course, possible that these men may be also members of the A.S.E.; it is not, however, as representatives of the A.S.E. that they must take their places on the joint council, but as automobile workers.

"The joint council of the motor industry," says *The Autocar*, "should consist entirely of men who are heart and soul in that industry, and whose minds are focussed upon the problem of making that industry prosperous. If half the council consisted of men who felt it their duty to refer all proposals to some outside body before confirming them, the whole object would be defeated."

The workers' representatives—were they also representatives of the A.S.E.—would, by their very nature, be controlled by a great body of engineers ignorant of their affairs and inevitably careless of their interests as automobile workers. This problem is one that will have to be solved sooner or later, and much hard thinking is necessary. To the motor cycle trade the problem is, perhaps, even more difficult than it is to the legitimate motor trade, because at the present time, while many motor cycle manufacturers regard themselves as members of the automobile industry, many car manufacturers look upon a motor cycle firm as something rather beneath the legitimate automobile manufacturer, and as coming much nearer to the cycle man. This attitude is one that needs clearing up and thoroughly threshing out. It will be to the mutual benefit of both car and motor cycle manufacturers that they come to some definite understanding, and the same also applies to the persons in their employ.

An index to the advertisements in this issue will be found on the page facing the back cover

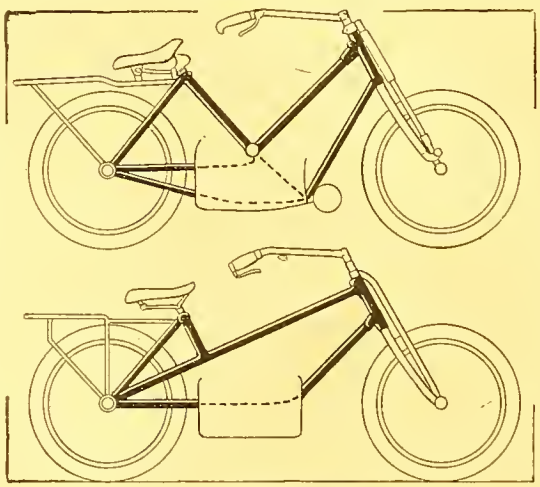
Occasional Comments by "IXION"

New Silhouettes.

THERE are distinct signs that the motor bicycle is at last departing from the outline of the push-bicycle, and the marvel is that the alliance has lasted so long. Longer steering heads combine with increased petrol capacity to render the horizontal top tube (or tubes) impracticable, and designers have turned out a weird assortment of alternative outlines, which vary considerably in strength, beauty, and cost of manufacture. I confess to a little mild surprise that the Scott frame has not inspired more copyists, for it solves many of the difficulties. At present the situation is that petrol tanks cannot be widened, and that extra depth at the front end is essential to good fuel capacity, especially for big engines. Longer steering heads point in the same direction. Taller engines are already clamouring for more head room, and this pressure will increase if overhead valves come into vogue on vertical and big V engines. Considerations of strength and beauty are both adverse to a top tube which slopes down to the rear at a mild angle, behind which the back forks slope down far more steeply. The Scott frame treats the rear triangle quite frankly as a bracket which carries (*a*) the back wheel and (*b*) the rider. Most makers continue to regard it as an integral part of the front frame.

The New Sun Vitesse Frame.

A GLANCE at the upper photograph on p. 604, *The Motor Cycle* of June 27th, will indicate the problems with which designers are struggling. Mr. Duffy has tilted his engine forward in the interests of a bigger tank, and has secured a long steering head, together with a frame which can be ridden by a girl in a short skirt or a man in a knee-long Burberry. He is doubtless satisfied with an arrangement which is a real advance on many previous designs. On the other hand, he has fallen short of the ideal. In one sense the steep slope of his top tube makes for beauty: if it had been given a gentler slope, and ended just under the saddle, the sharp dip of the rear forks would have jarred. On the other hand, as my eye follows this tube, I expect it to continue to the rear hub: and its sudden termination at the saddle-pillar tube gives me a jolt. Furthermore, this æsthetic consideration is fortified by mechanics; for if the tube had been carried in a straight line to the back hub, the frame would have been stronger, or, alternatively, the saddle-pillar tube could have been lightened. Incidentally, Mr. Duffy's task has been considerably eased by the fact that this cheap machine is not sprung. Reverting to beauty, one notes that all the main components of the silhouette are either straight or circular, except the front fork, which is built up of two straight tubes slightly curved at opposite ends: in this case appearance has been subordinated to cheapness of manufacture. Somehow the machine suggests that Mr. Duffy was feeling after an idea parallel to the Scott notion of a triple frame, viz., (1) a fore triangle, carrying the front wheel, tank, and engine; (2) a base triangle, uniting the fore triangle to the rear wheel, and supporting (3) a triangulated scaffolding, on which the rider might perch, and to which various small accessories might be fixed.



Two types of triangulated frames.

That Sloped Top Tube.

THE more one thinks about the now all but universal sloped top tube the more it seems that its present use must be varied. The frame designer's ideals are necessarily complicated by the type of engine which he has to house, by the amount he may spend on the frame, and by other variants. When possible he aims at getting the maximum of strength with the minimum of weight. If he is already tied to the sloping top tube, he can only pursue this ideal by two methods, to the best of my knowledge. By the first method he brings his top tube down steeply, *à la* Scott, so that it meets a line drawn between the hubs at the point where bottom brackets used to sprout, supports this "front triangle" on a base triangle, which extends rearwards to carry the rear wheel, and mounts on the base triangle a "rear triangle" scaffold for the rider and saddle. This frame might be christened the "three triangle type." By the second method he carries his sloping top tube right through to the rear hub, and adds a scaffold perch for the rider, in which case we get a "two-triangle" type of frame. It is conceivable that we shall presently arrive at a type of frame in which the rider is supported from behind instead of from the front, as is usual. At present we use a heavyish tube on many frames, partly as a support for the rider, but perhaps mainly as a brace for an extremely unmechanical type of non-triangulated frame. We also use quite a sturdy structure astern for supporting the luggage carrier, which is often made strong enough to support a load of

Occasional Comments.—

200 lb. We may in future support the rider and the carrier on one and the same scaffold, and eliminate the present "saddle pillar tube."

The Open Frame.

THE three main advantages of the open frame are that a girl can ride it, that a man can sit it in a long coat, and that it usually holds the road better than the diamond pattern. The last point is of no practical value, except for racing purposes. The other two factors have some commercial interest. Very probably the main influence of the war on motor cycling will be a huge influx of feminine riders. I do not know that the skirt affects this point very materially. Feminine fashions are fickle, but the war has certainly shortened skirts, which are retreating kneewards at a great rate, and in many cases have actually surrendered to breeches. In any case, I suppose many girls will wear skirts after peace returns, and quite a few of them will prefer longish skirts. In this case every motor cycle manufacturer will experience an appreciable demand for open frames, and if he adopts such a design it will pay him. As far as men are concerned, an open frame is the thing on tour: one can walk about the streets after the day's run in leggings and a waterproof reefer, but one looks rather odd. Open frames or semi-open frames might be confidently predicted if they lent themselves readily to any old engine: but it must be confessed that the housing of a flat twin or a four-cylinder in an open frame is not as easy as it looks. What price the double flat twin mounted in the base of a "three triangle" frame?

Petrol after the War.

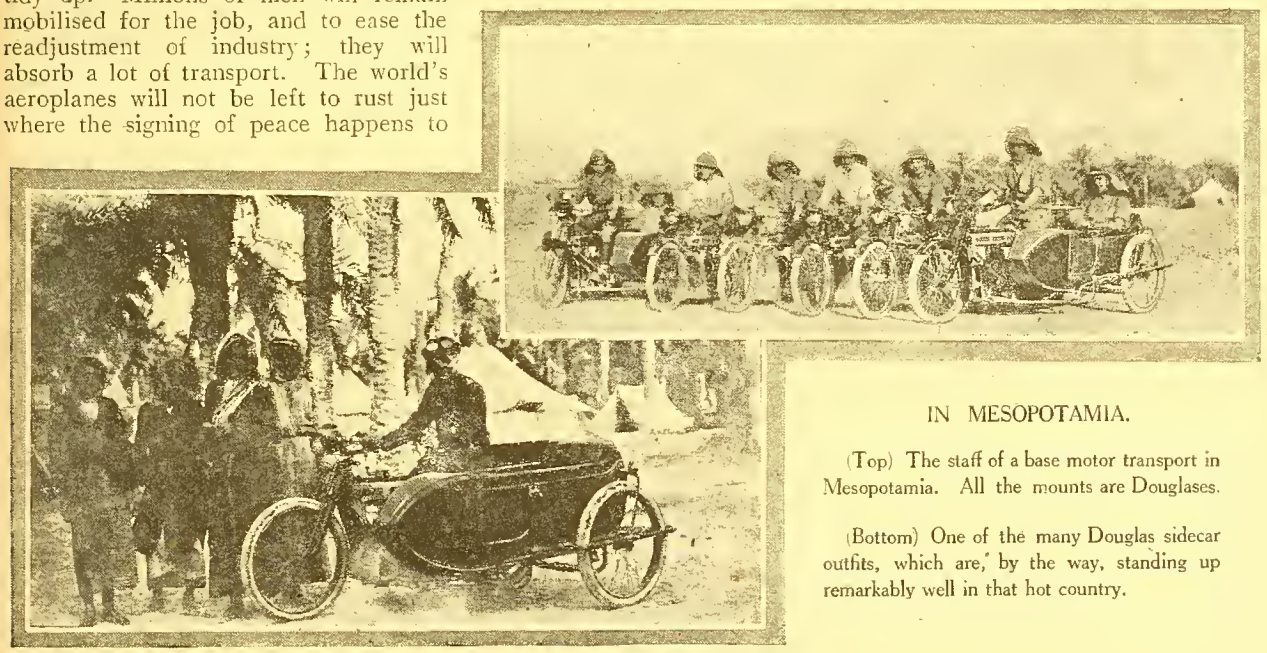
A MOMENT'S reflection will show that the petrol shortage must survive the war by a tolerable period. The various Services will have inconceivable tons of stores, camps, ammunition, etc., to tidy up. Millions of men will remain mobilised for the job, and to ease the readjustment of industry; they will absorb a lot of transport. The world's aeroplanes will not be left to rust just where the signing of peace happens to catch them. Sunk tank steamers will not bob merrily up to the surface when Hindenburg is murdered in the streets of Berlin. The dear old days will not return, nor Dora decease, the instant the Kaiser cries "Kamerad." And *shan't* we just grouse till the war restrictions have all one by one petered out?

Caught!

THE recent torrential rains caught hundreds of lady D.R.'s napping. It was pitiful to see a neat pair of khaki silk stockings after a flying trip at the bar of a sidecar down a London thoroughfare all abrim with liquid filth. As the weather stiffens up for the autumn I expect most of these dainty war-time chauffeuses will learn to despise appearances, and don Hutchinson waders or oilskin leggings. But their smiles never came off, even when their trim ankles had vanished under clotted alluvial deposits.

A Hint to the Trade.

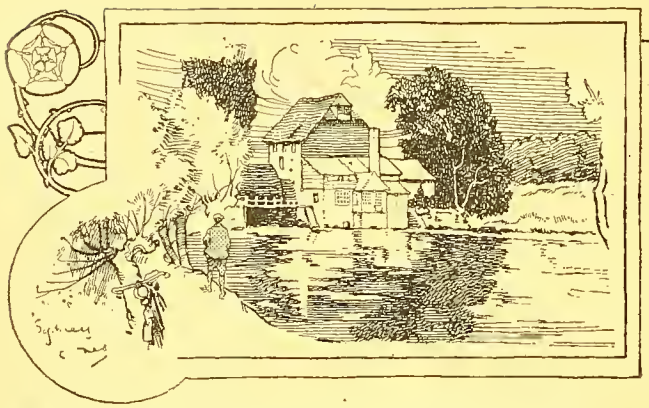
AFTER the war motor cycles are going to sell to the fair sex in increasing quantities. All the "army learnt" lady drivers will want to motor, and comparatively few of them will run to cars. Now I notice that the girl riders do not seem to care for their kick-starters. Perhaps one of them will explain the reason. I merely observe that in nine cases out of ten the khaki-clad damsels start their sidecars by pushing in lieu of digging the starter; and I can only surmise that the feminine ankle is too weak to administer a sharp enough dig. The best of these starters cannot boast excessive leverage, and many of them are unreliable. Quite a number of middle-aged men similarly eschew the kick-starter, and Mr. Ellison's recent notes on kick-starting a B.S.A. do not cover all the ground. Let manufacturers rack their wits, and see if they cannot devise an improved starting mechanism. It has been badly needed for years, and the influx of thousands of girl riders and wounded men will accentuate the demand.



IN MESOPOTAMIA.

(Top) The staff of a base motor transport in Mesopotamia. All the mounts are Douglases.

(Bottom) One of the many Douglas sidecar outfits, which are, by the way, standing up remarkably well in that hot country.



HORIZONTAL ROTARY ENGINES.

Will the Horizontal Rotary Power Plant ever be Successfully Applied to Motor Cycles?

ALTHOUGH the interest now displayed concerning the rotary engine as a propellant for motor cycles is due to the aeroplane, this type of engine has been tried several times by motor cycle engineers, and is no new thing in the world of two-wheelers. A radial rotary engine had been designed, built, and fitted in a motor cycle before Henry Farman and the Wright Bros. startled the world with their initial flights.

The writer tried one of these machines, and, despite its many faults and crudity of construction, its smooth running could be likened only to a steam or electric-driven machine.

Undoubtedly there are many advantages to be derived from a rotary engine in a motor cycle, among which weight reduction and smooth running are not the least important. Both these points are possible

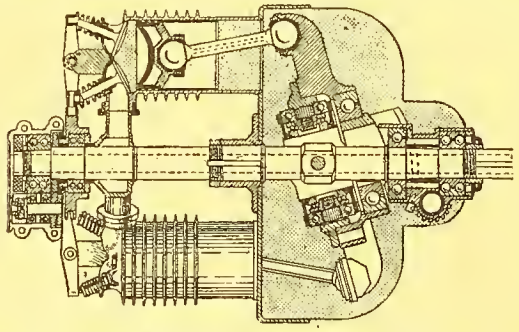


Fig. 1.—Sectional drawing of the five-cylinder Macomber rotary engine, in which the cylinders rotate parallel to the axis.

because in a rotary engine nine-tenths of the weight is rotating, and this renders a flywheel or flywheels unnecessary.

In previous articles which have appeared in *The Motor Cycle* it has been shown that it is extremely difficult to accommodate a radial engine in a motor cycle frame. This same difficulty is present when the radial rotary or the stationary radial is considered in connection with a car, although, in this case, there is considerably more room available.

The Rotating Engine with Horizontal Cylinders.

There is another type of rotary engine, however, which as yet is foreign to motor cycle practice, but which appears to offer greater possibilities than the radial type. This is the horizontal rotary power plant, which several makers have built with most encouraging results. Although adapted for aeroplane work, it is interesting to note that some of these engines, and one in particular, are commercial propositions, and are in use for other purposes.

The particular engine referred to is the Macomber, which has been used extensively in America for irrigation work, and, what is more interesting to the motor cyclist, is fitted in a marketed car.

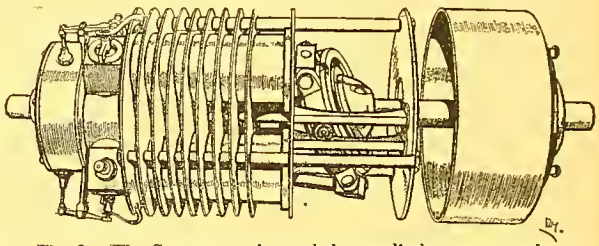


Fig. 2.—The Statax experimental three-cylinder rotary engine, which developed 10 h.p. and weighed 50 lb.

Two or three years ago this engine was fitted in the Eagle light car, a 6 cwt. American proposition which sold for about £78, but for 1918 a larger size engine is fitted in a high-priced seven-seater car.

A Three-cylinder Engine giving 1 h.p. per 5 lb.

A similar engine, known as the Statax. was exhibited at the last aero show. This machine had three air-cooled cylinders, and, although weighing but 50 lb., developed 10 h.p. The weight and power coincide with the requirements of the motor cyclist, and, therefore, perhaps are more interesting to readers of *The Motor Cycle* than the five-cylinder Macomber, the weight of which works out at 9 lb. per h.p. as compared with 5 lb. per h.p. of the Statax.

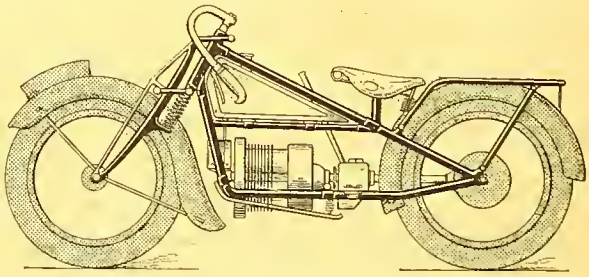


Fig. 3.—The horizontal rotary engine in a motor cycle frame. The inlet pipe in an engine of this kind would be through the forward central bearing. The casing over the valve gear is intended to be an annular silencer.

As will be seen from the accompanying illustrations, this type of engine is by no means complicated. There is no crankshaft, but in its place a stationary shaft carrying a "wobble plate," *i.e.*, a circular member

Horizontal Rotary Engines.—

revolving on a centre slightly diagonal to the general axis. The connecting rods are secured to the periphery of the "wobble plate," and a little consideration will show that if the piston moves down its cylinder it must turn the engine round until the periphery of the plate is further away from the head of the engine.

Both the Statax and the Macomber work on the four-stroke cycle, the latter having both valves in the head of the cylinder. In this engine there are no push rods employed in the valve action, the valves being operated directly by rockers from a single cam. The mixture from the carburetter is fed to the cylinders through a central passage by centrifugal force, while the lubrication is by force feed through the shaft and main bearings, up through a duct to the hollow connecting rods, and thence to the pistons.

In fig. 3 I have attempted to depict how a horizontal rotary-engined machine would appear, and I think it will be admitted that on the points of compactness and appearance it is far superior to the attempts made to fit a radial rotary engine in a motor cycle frame.

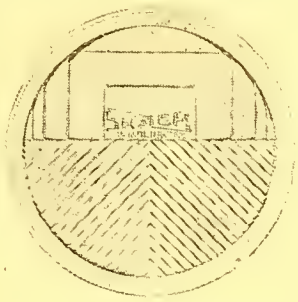
VEDETTE.

ELIMINATING THE GLARE.

A Possible Post-war Motoring Problem.

BEFORE the war and the lighting restrictions inflicted upon the motoring world by D.O.R.A. there were signs that eventually public opinion would demand a law prohibiting the use of glaring head lights. There also was a tendency for motorists and motor organisations to adopt a "wait-and-see" attitude, preferring to leave well alone to making a move to render legislation unnecessary.

The same conditions once prevailed in America. So long as the law permitted unrestricted lighting, motorists took full advantage of the fact, and, with the improved systems of illumination, gradually increased the power of their head lights until the limit of public patience was reached. Then came legislation and chaos. Almost every State has its own laws concerning lights, and on this question the lot of the touring motorist over there is an object lesson which motorists in this country should take to heart.



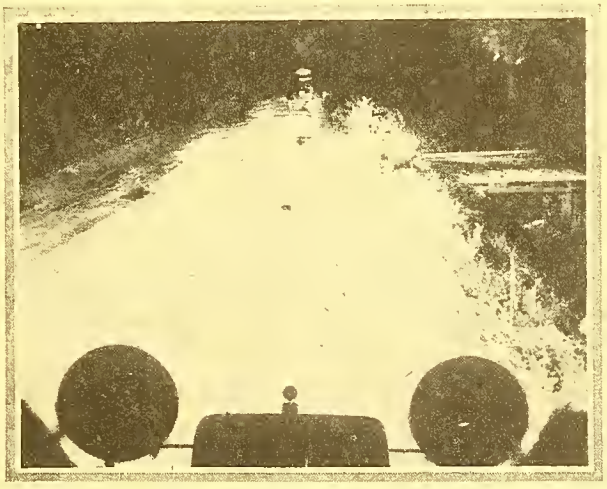
The Shaler anti-glare lens.

We all know the methods of Governments when it comes to questions of motoring legislation. There is a great deal of difference between eliminating the glare and dimming the light. To accomplish the former result the Government most likely would compel us to adopt the latter course.

Now, if lamp manufacturers and the motoring organisations will go to work quietly and quickly they may bring about the production of non-glare lamps which may forestall legislation altogether, or, should the Government take action in the future, will set a standard, and prove that it is not the power of the lamp that causes inconvenience, but the amount of glare.

What is necessary is a lamp which will throw a light on the ground as far as we want it and be of no inconvenience to other users of the road. Since America has so many lighting restrictions, we can look across the Atlantic to see if such a lamp is possible, and among the many excellent, and, incidentally, many indifferent, devices on the market we find at least one which seems to fulfil our requirements. This is the Shaler lens, illustrated here. The second illustration is one of the best night photographs the writer has ever seen, and while the reproduction may not fully illustrate the value of the lens, it serves to show the point which lamp manufacturers should consider in the future. Incidentally it should be remarked that the photograph has not been touched up in any way. It will be noticed that there is a broad beam of light on the road for the first hundred feet or so ahead of the vehicle, and, after that, a narrow intense illumination that penetrates into the distance and illuminates the road in the same manner as it would were the lamp of the ordinary head light type with a clear glass front.

Examination of the photograph will reveal that, while the lower parts of the tyres of the car ahead are illuminated, the top part of the vehicle is in darkness, which shows that anyone but a child walking along the road would not be inconvenienced by a glare.



Untouched photograph showing how the Shaler road lighter illuminates the ditches.

The Shaler lens divides the light into three distinct beams. These are distributed on the road so as to produce the ideal lighting conditions—a long, narrow, concentrated, distance beam and two other concentrated beams that, taken together, give the effect of a pair of regular head lights. No glare is produced because none of the light rises above the level of the lamps.

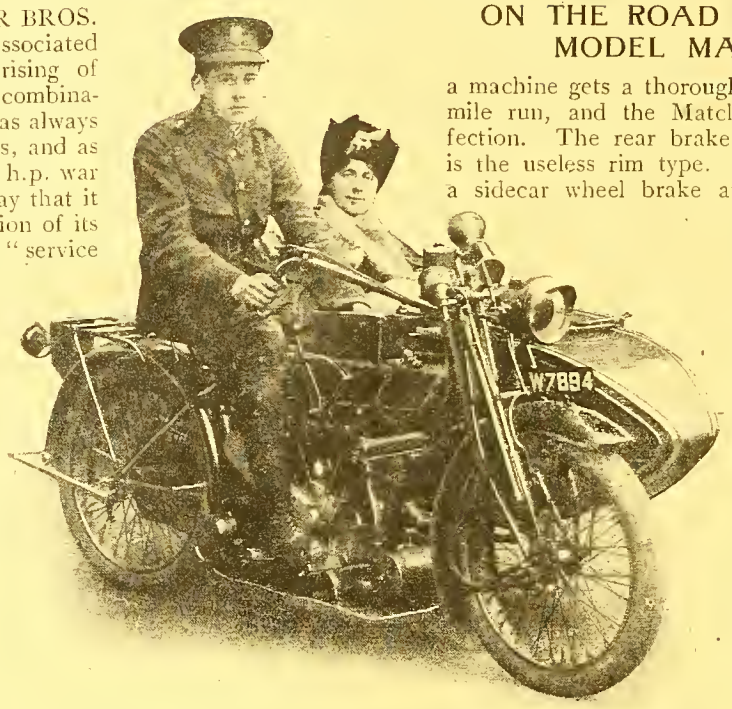
The cost of such lenses as these is very moderate. The Shaler device sells in America for approximately 11s. 6d. in the 8in. size.

E.J.A.

A THOUSAND MILES ON A BIG TWIN.

ON THE ROAD WITH A WAR MODEL MATCHLESS.

MESSRS. COLLIER BROS. have long been associated with the popularising of the high-powered sidecar combination, and their big twin has always been a leader in this class, and as my present mount is an 8 h.p. war model Matchless I can say that it fully upholds the reputation of its makers. It is finished "service grey" throughout, and fitted with extra long sidecar body. A triple Orto windscreen ensures the comfort of the passenger. Hutchinson tyres (700 × 80 mm.), in conjunction with a Brooks saddle, give a moderate degree of comfort on our war-time roads; but the one thing needful to turn a luxurious outfit into a three-wheeled "Rolls" is a spring frame. This deficiency is to be remedied in the post-war Matchless.



The military model Matchless, experiences with which are described on this page.

The most useful and novel feature of the machine is the spare wheel; with the detachable and interchangeable wheels fitted the puncture bugbear is reduced to a minimum. Five minutes only is entailed in the changing of a wheel and in getting off again, and, should another tyre puncture, the support on the rear of the sidecar forms an ideal position for repair work. In fact, once having experienced the joys of this fitment, I shall never purchase any machine without it.

Mudguarding and Gadgets.

I have, I confess, a mania for gadgets, but only practical and useful ones. Mudshields and a home-made undershield are giving excellent service by reducing time taken in cleaning; knee grips adorn the tank, and plug coolers—again home-made—reduce pre-ignition on war fuels.

Since August the outfit has seen hard service in all weathers, and but for sooted plug—I oil too liberally—and punctures, has never let me down. With regard to tyres, I have been rather unlucky—five punctures and a cut in one month. I then fitted nail-catchers—a spoke almost grazing the tread—and since then I have not had any trouble. Surely if the efficacy of these simple extras was better known they would be fitted as standard by makers. "Madge," as we christened the 'bus, is rather hard on tyres, although carefully driven—possibly the absence of a shock absorber has something to do with this. The chains have not needed attention; from them and their cases one hears never a sound. I recommend them to "Ixion," and the clutch—well, the Matchless clutch is a byword for all that is desirable. In the North a machine gets a thorough testing in every thirty-mile run, and the Matchless shows up to perfection. The rear brake is excellent: the front is the useless rim type. How acceptable would a sidecar wheel brake and a front one of the B.S.A. type be in the descent of such roads as the "Winnats."

For the engine I have nothing but praise. (What a hackneyed phrase, but it is true.) In conjunction with the three-speed gear box, it will take the machine anywhere: it will pull for miles on second gear and on pure paraffin without overheating, and roars up hills as if they were level, and, with the exception of a very "hot" Sunbeam, has passed every combination with which I have "scrapped" on the open road.

An Amac carburetter is fitted which vaporises paraffin perfectly—petrol being used for starting. Consumption runs about 46 m.p.g.—not very good, but the vim in the engine compensates for this.

In traffic remarkable docility is attained by adjusting the throttle so that when it is closed the engine just turns over; there is no fear of stopping it accidentally, and the valve lever and switch suffice for sudden stops.

Speed.

Being young (and foolish), I cannot resist using the ample power in a little speed work. This will probably be interesting to "average speed men." On top gear, down a slight incline on a deserted road, we touched sixty (on petrol), according to Watford speedometer; on second I can do forty all out; and on bottom about eighteen to twenty. But my fastest run—from Castleton to Sheffield, eighteen miles—was done in forty minutes, in order to get in before lighting up time. The final two miles of deserted Tarmac were taken at forty-five without a single falter. This, however, did not succeed in bringing the average for the trip to more than 27 m.p.h., which should make some speed merchants think. So much for speed: and I think it shows that averages of 44 m.p.h. are never made on the road—at least for more than a mile or two.

ROTOR.

Will the trade make big efforts to capture the Overseas trade? In conversation with two manufacturers recently, we were told that, unless the Government does something to assist foreign business, they would not trouble about Overseas trade, as before the war it was not worth the trouble.

DON'T FEEL SORRY FOR A DISABLED MAN—EMPLOY HIM.

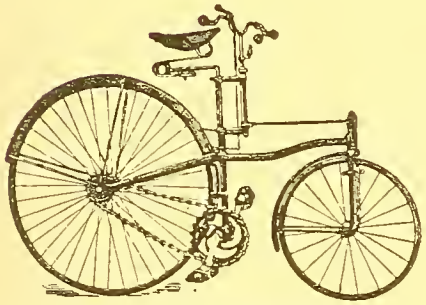
1854 1918

From the Days of the Crimea

SOME EPISODES IN

B.S.A. HISTORY.

THE FIRST B.S.A. SAFETY BICYCLE



The first B S.A. Safety Bicycle.
Made in 1884.

OF the various types of bicycles and tricycles produced by the B.S.A. Company during the infancy of cycling, many are still remembered as representing some of the finest examples of cycle construction in their day. It was, however, in the year 1884 that what may be regarded as the forerunner of the present safety bicycle was introduced by the B.S.A. Company. Crude though it may appear in comparison with the modern B.S.A. Bicycle and Motor Bicycle, the easy running and reliable service which B.S.A. riders enjoy are directly due to the pioneer work and experience gained in constructing these early models.

THE BIRMINGHAM SMALL ARMS COMPANY LIMITED.
BIRMINGHAM.

Fame Speaks

In those glorious Post-War days, how you will revel in the things which are denied you now!

When the roar of guns is silenced—when the cruelty of War gives place to the harmony of peace—when the "big black cloud" has passed away—when the "boys" come home—when the petrol puzzle is no longer—

THEN, indeed, "all England will be yours," and the

CLYNO

will once more demonstrate its absolute supremacy among passenger machines.

But (and there's always a "but" in all our "pleasantest" anticipations) in those days the Clyno policy will be

MASS PRODUCTION OF ONE MODEL (8 H.P.)
COMPETITIVE PRICES FOR BOTH OUTFIT AND SPARES.
ROTATIONAL DELIVERY

and in view of the ever-widening demand, if you would reap the earliest pleasure from those new conditions, you must act NOW!

Agents everywhere are now booking Clyno Post-War Orders—see yours or ask us for our latest Folder—
THE CLYNO POST-WAR MODEL.

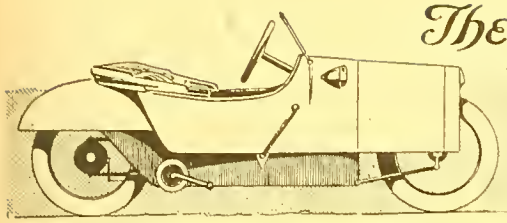
THE CLYNO ENGINEERING CO.,
Pelham Street, WOLVERHAMPTON.

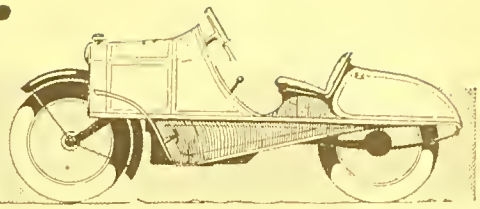
THE FIGURE OF FAME

1588

In answering this advertisement it is desirable to mention "The Motor Cycle."

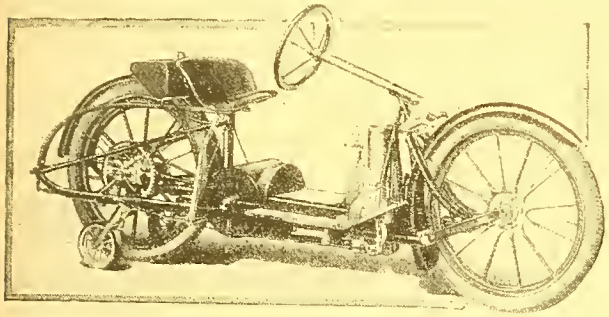
The Bi-Car





Some Unconventional Designs intended as Improvements over Existing Machines.

WE are prone to grumble that the motor cycle is little more than a bicycle with an engine, gear box, and tank attached to its framework, and frequently it has been said that the car designer has done better. Although the car started out as an engine in a horse carriage, the designer quickly discarded the practices of the carriage builder and produced a new type of vehicle.



The American Militaire, a model embodying many striking features

We are apt to forget that many attempts have been made to change motor cycle design by discarding the conventional tubular frame, substituting pressed steel and enclosing the machinery. The results to date are not very encouraging, and probably designers do us greater service by following orthodox lines.

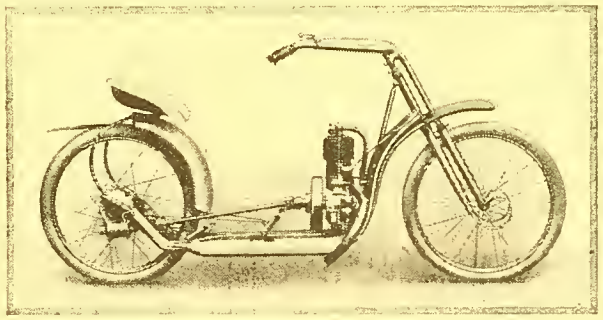
Originality and Freakishness.

It is generally found that those who advocate entirely new designs are the first to condemn a machine as a freak if it departs from the conventional in a very marked manner. A certain well-known competition rider once gave me the specification of his ideal motor cycle. The designer of the American four-cylinder Militaire machine practically followed this specification, yet when this design appeared in *The Motor Cycle* my friend condemned it as a freak, which goes to show that many people do not realise how their suggestions would appear if produced.

However, the car on two wheels idea is not dead. Every fresh crop of riders includes men who would revolutionise design, and nearly all fall into the same error. The first point that appeals to them is the recumbent driving position attained in the sporting car. To secure this the wheelbase is increased considerably, and this renders such a vehicle unwieldy.

An American Specification.

The American Militaire is an example of the redesigned motor cycle embodying several features of the car. It has a pressed steel "underslung" frame, four-cylinder engine, shaft drive, self-starter, and artillery wheels. The tyres are 28in. × 3in., and there are idler wheels controlled by foot lever. One of the most interesting features is the reverse gear. The fact that a reverse is included in a machine designed for solo use—and it is claimed that such is its purpose, hence the idler wheels—rather suggests that a "standardised" light car gear box was chosen, and as such units seldom are made without reverse gears, the designers of the machine offer the public something they do not want. A reverse gear on a sidecar combination is of doubtful value, while on a solo mount it is worse than useless, and suggests hair-raising experiences should the careless solo rider engage his reverse instead of his first speed when getting away.



The Wall, another design showing a designer's attempt to steer clear of the stereotyped practice in motor cycle building.

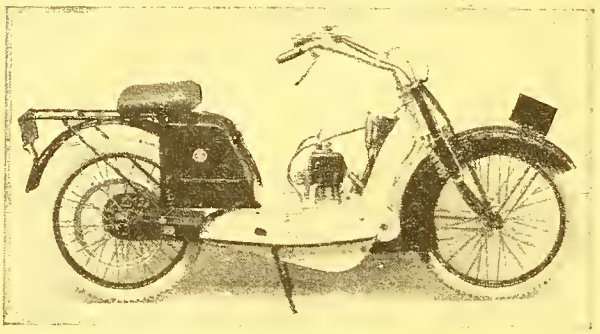
The wheelbase of this machine is 65in., which is considerably longer than British riders would care to have in a machine used when the roads are greasy, although, on dry roads, the long wheelbase would tend to make the machine more comfortable.

The early Militaire, too, was an interesting machine, embodying a single cylinder engine, friction transmission and wheel steering, but neither model apes the car in point of appearance as does the latest

The Percival White super-cycle.

The Bi-car.—

American attempt to produce a car on two wheels. This odd two-wheeler is a cross between a motor cycle and a child's toy automobile—a combination which many riders will liken to a mule : "that animal without pride of ancestry or hope of posterity." It has several interesting points nevertheless. Like the Militaire, it is equipped with a pair of idler wheels to support the machine when stationary. The rear wheel is sprung on long half-elliptic springs, while the engine is located beneath a bonnet which has an imitation radiator. All mechanical parts are completely covered, so that the driver is protected from grease and dirt. An instrument board on the dash, a "racing car" seat, a turtle back over the rear



The Swan, one of the few motor cycles possessing originality in frame construction.

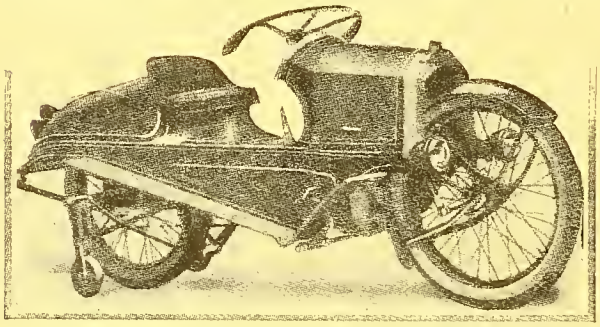
wheel and running boards, give the contrivance an automobile-like appearance. The turtle back also hides a folding "dickey" seat, which when raised offers accommodation for a passenger.

The idler wheels are automatically operated, and the machine may be started and stopped without requiring the driver to place his feet on the ground.

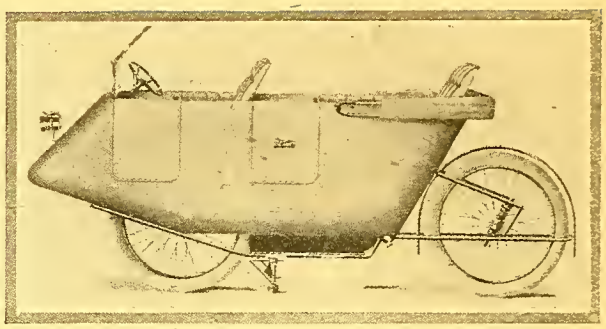
Super Cycles and Streamlining.

An interesting English design is the Percival White Super Cycle. In this machine wood is used in the frame construction, which is very like that of a cycle car, and a streamline body is fitted which almost completely encloses the wheels. The steering arrangement of this machine is an absolute novelty, and was described at length in our issue for January 15th, 1914.

Mr. A. V. Roe, the well-known aeroplane pioneer, patented a streamline motor cycle design in 1912, about which date readers of *The Motor Cycle* showed



An American hybrid. In this attempt the designer appears to have ignored accessibility.

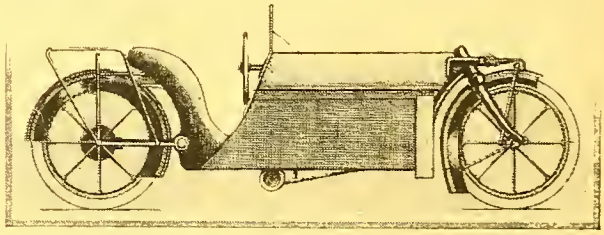


The Greyhound tandem-seated bi-car, recently patented by an English company.

a great interest in the streamline motor cycle, but the idea then appeared to be suggestions for reducing wind resistance rather than the question of making the motor cycle more weatherproof and a cleaner machine to ride.

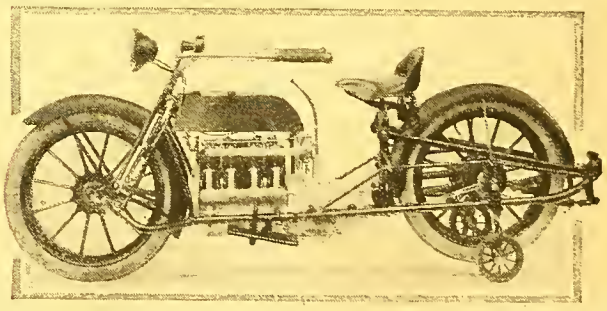
Protection from Dirt.

The Wall and Swan designs, also illustrated here, are other English examples of attempts to get away from the conventional tubular cycle frame. In both these cases the main point was to protect the rider from oil and dirt from the mechanical parts. It is a vehicle on two wheels which would give the same protection from grease and mud as is enjoyed by the driver of a car.



A reader's suggestion, weird in many respects, but an ingenious attempt to solve the mud problem.

Who shall say that such machines will never come into favour? They may not appear suitable for scaling the mountains in a six days trial, but if they were mechanically efficient several of them would have a lot to recommend them to the hundreds of potential buyers of handy vehicles for business and professional purposes, to whom cleanliness is an essential wher visiting their customers and clients.



The latest model Militaire with four-cylinder engine, car-type gear box with reverse, artillery wheels, self-starter, underslung "chassis," and car-type springing.

CURRENT CHAT

TIME TO LIGHT LAMPS

SUMMER TIME.

Aug. 1st	...	...	9.18 p.m.
,, 3rd	...	...	9.14 ,,
,, 5th	...	...	9.11 ,,
,, 7th	...	...	9.8 ,,

An American Long-distance Race.

At Grand Island, Nebraska, U.S.A., a most successful motor cycle race meeting has been held. Don Johns, of Los Angeles, succeeded in winning the 100 miles prize on an Indian, covering that distance in 1h. 0m. 22s. The twenty-five mile race was won by Bagley on a Harley-Davidson. Time, 20m. 19s.

R.A.F. Pilot Cadets.

Cadets who are anxious to join the R.A.F. as pilots on reaching the age of seventeen years ten months are not debarred from getting their C.O.'s recommendation, even if they suffer from a slight amount of lameness, provided they are absolutely physically fit, if they are otherwise suitable.

SPECIAL FEATURES

THE BI-CAR.

FOUR-CYLINDER MOTOR CYCLES: PAST AND PRESENT.

The A.C.U. M.M.D.

Since the inception of the Auto Cycle Union Motor Messenger Detachment scheme at the end of last year its riders have up to date covered 106,709 miles in taking messages from the G.P.O. to various Government Departments.

Motor Cycle Wastage in the U.S. Army.

The American Army is apparently going through the same stages as the British Army did in the early part of the war. The amount of economy exercised in the M.T. section of our Army at the present time is quite surprising, as we have found on many visits to various units during the last two or three years.

In the U.S., however, matters are somewhat different. It appears that machines are driven much too fast, and are shaken to pieces. Their inspection is poor, as recently a machine was found to have been ridden with the wheel bearing cones locked owing to several broken balls, and that the axle had been turning in the fork ends, and was nearly worn through. On one occasion a man who had never had any workshop experience was appointed to a camp as head civilian motor cycle repairer. In the same camp there was a pile of slightly bent forks and frames, wasted by ignorance and shiftlessness; for instance, when a spring fork was broken the entire fork was scrapped, instead of the sound parts being salved.

American Machines Increase in Price.

It is anticipated that, owing to the rise in prices of raw materials the cost of motor cycles in the U.S.A. will be increased by August 1st.

Ford and the Tanks.

Henry Ford, the one-time pacifist, who is now all out to get the war over, has disclosed a great deal of enthusiasm for small Tanks. "A small Tank," he writes, "can be made for attack which will carry two men and a machine gun, with armour protection strong enough to resist a hail of machine gun bullets and shrapnel splinters. Such Tanks, if standardised to one model, could be made in three months. Each Tank, carrying two men, shielded by armour-plate and armed with a machine gun, would have the offensive power of fifty soldiers with rifles. That advantage would come from the possession of the better piece of fighting machinery."

EAST YORKS MOTOR VOLUNTEERS.

Last week the motor cyclist members of the East Yorks A.S.C. (M.T.) Vol. arranged a test run to judge time and distance and report on the road conditions. The photograph shows a detachment being sent off by the adjutant, Capt. Lockey. The title of the corps is now changed from East Yorkshire Motor Volunteer Corps to the Motor Volunteer Corps, East Yorks A.S.C. (M.T.) Volunteers.

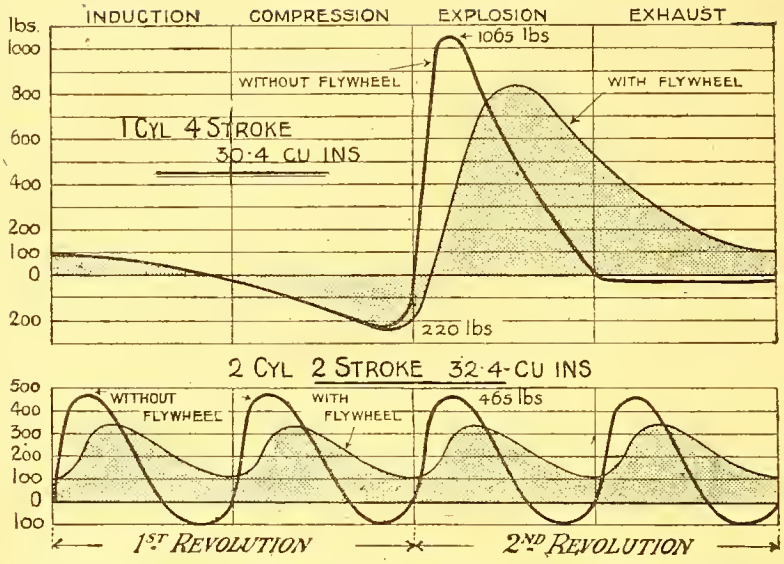


Chart showing the chain pull of a 500 c.c. single-cylinder four-stroke engine and a 532 c.c. twin-cylinder two-stroke. The chart also illustrates approximately the difference in the chain pull of a single and that of a four-cylinder engine (See article on page 102.)

August 4th

Next Sunday—the fatal anniversary—petrol may be used for travelling to and from the nearest place of worship. No extra petrol will be issued for the purpose.

Ware Thief

Those fortunate enough to be able to use their machines nowadays will be well advised not to leave them unprotected in the streets Four separate instances have come to our notice of the theft of accessories and attachments from machines.

Horses Again.

The sportsman who regretfully relinquished his sidecar outfit and endeavoured to console himself with a hired horse-drawn vehicle is to receive further attention from the Board of Trade. Certain classes of horsed vehicles are to be prohibited for "joy-ride" purposes.

Foreign Trade.

Will the British make big efforts to capture the Overseas trade? We think not—at least, not until outputs exceed home demands. In conversation with two manufacturers recently, we were told that, unless the Government does something to assist foreign business, they would not trouble about Overseas trade, as before the war it was not worth the trouble.

The Motor Cycle in Nigeria.

An enthusiastic reader in the Public Works Department, Nigeria, writes: "I have read and enjoyed *The Motor Cycle* for over fifteen years regularly in Nigeria, and propose to continue to have it. The majority of motor cyclists in Nigeria are Government men, and use their machines in the execution of their work (roads, telegraphs, etc.). I have had during my service (P.W.D.) out here three Douglases, a Moto-Rêve, an F.E. Triumph, a 4-5 h.p. Bat-Jap, and now I have a 7-9 h.p. Harley-Davidson."

To Exploit Home-produced Fuel.

A company has been formed called Oilfields of England, Ltd., with a quarter million pounds capital, to purchase or lease and develop oil-bearing land, and to refine and sell the products. Will anything really get done this time we wonder?

Lubricating Oil from Hemp Seed.

Oil of a quality suitable for motor engines is being obtained in Russia largely from hemp seed.

The presses produce a yield of from 5% to 6% of a dark-grey coloured oil. Refining and filtering processes give, as a pure lubricating product, 30% of a clear yellow oil. The coarse residue is used for soap-making. As the manufacture has been carried on mainly by Austrian prisoners of war, the processes will soon become known in Austria-Hungary and Germany. An important point in this connection is the great increase in the cultivation of hemp in Germany, where, consequently, large quantities of seed are already available.

The Norton Quad.

"Ixion's" reference in last week's issue to a quad or cycle car produced by Norton Motors, Ltd., may occasion some surprise. We have been permitted to see the preliminary lay-out, and an experimental model is in preparation, but many details are still undecided, and it is unwise to prophesy what its future will be. As a lightweight runabout it shows great promise, and, with Norton experience directing its construction, it may prove to be a real forward step in the cycle car problem.

"Work of National Importance."

Would-be M.P.'s and their agents *are* to be allowed petrol at election times.

The Ladies' Mount.

Australian agents are busy selling 5 h.p. and lightweight twin models to lady riders.

French Luxury Tax

Under the revised French luxury tax motor cycles and sidecar outfits costing more than £80 will be taxed 10% of their value.

A Suggestive Comment.

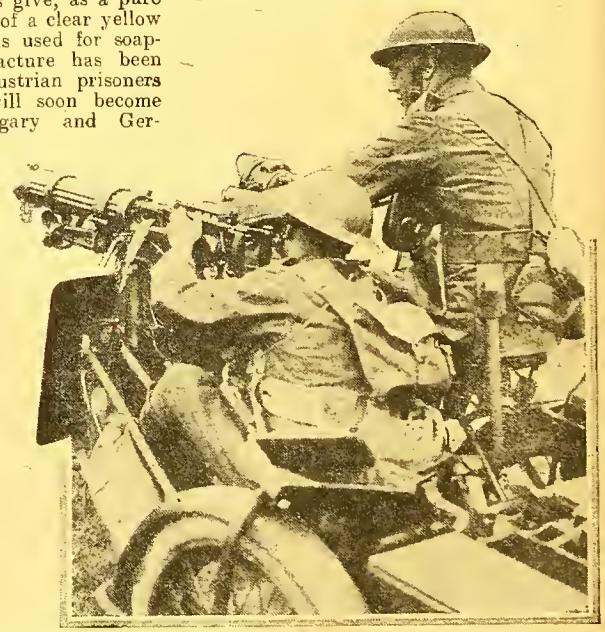
Said a cynical friend to us, as we were admiring the self-sacrificing munitioners on strike last week, "What's the use of petrol if you have no time to use it in? And what's the simplest way of getting a holiday?"

An Inventor's Partnership.

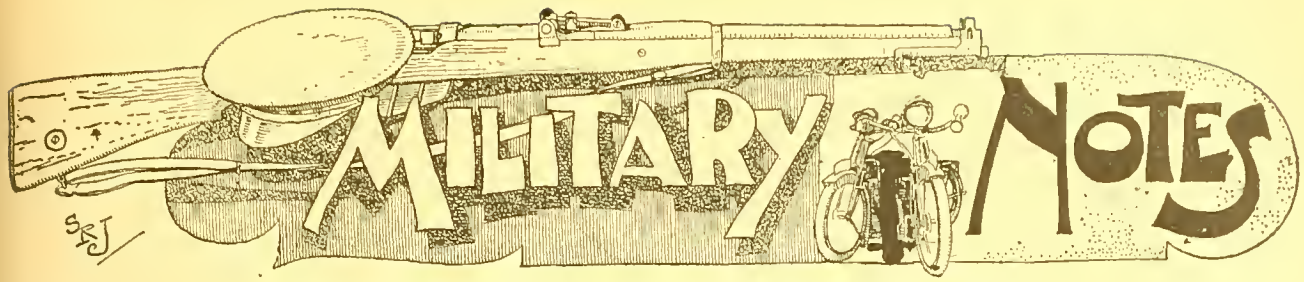
Mr. W. Starley, the prolific inventor, has joined up with the Johnson Motor Co., Ltd., of Birmingham, who will market all his future patents, including wheels and frames of novel design for motor cycles and a new front wheel drive cycle car.

Shortage of Lubricating Oil in Germany.

Many big fires have occurred lately in industrial establishments and factories in Germany, the reason being the shortage of oil and grease for lubrication purposes. Owing to the high prices, it is necessary to economise with the lubrication, and the risk that the bearings run hot is very much increased, and the danger of fire is great when using inflammable oils.



A motor machine gunner in France fixing a belt of ammunition to the machine gun on the Clyno. Many of these outfits are now in use on the Western Front, and play an important part, though probably not a spectacular one, in the various operations.



Despatch Riding in Turkey. More Tank Honours.

ARMY AND NAVY UNIFORM.

A NEW D.O.R.A. Order prohibits the use of gold lace except on Navy, Army, R.A.F., or mercantile marine uniform.

OFFICERS' PROMOTION.

THREE officers well known in the motor cycle world have lately been promoted to the rank of captain: Lt. W. M. Pedley, R.A.F., the manufacturer of the Pedley belts and tyres; Lt. Geoffrey Smith, M.B.E., R.A.F., formerly Editor of *The Motor Cycle;* and Lt. E. W. Walton.

DEATH OF CAPT. H. CLARKE.

WE regret to announce the death of Capt. H. Clarke (Inniskilling Dragoons), of Leamington. Before the war he was well known to Midland motor cyclists as the maker of the Invicta cycle car. Capt. Clarke served in the Boer War, gaining his captaincy in a very short time; and when the present war broke out he offered his services, and was given a commission in the Dragoon Guards, afterwards being transferred to the Inniskilling Dragoons. He went to France in December, 1914, but was invalided home in October, 1916, with trench fever, and was never fit again for active service. Capt. Clarke was forty-six years of age.

HONOURS FOR TANK HEROES.

MAJ. RALPH BROOME, D.S.O., M.C., commanded thirty Tanks and cleared the way for infantry to an enemy position.

CAPT. WALTER GERRARD, D.S.O., organised crews of disabled Tanks into Lewis gun sections, which he led into action.

MAJ. L. S. HENSHALL, D.S.O., followed his Tanks on foot to the capture of a village.

MAJ. DOUGLAS PRATT, D.S.O., M.C., directed operations on foot, his Tanks successfully reaching their objectives.

CAPT. CLIVE KINNISON, Bar to Military Cross, for organising the advance of twenty-two Tanks in very difficult conditions.

CAPT. DAVID RAIKES, D.S.O., M.C., directed his Tanks in an attack with an utter disregard of danger.

CARS AND CYCLES ON THE TURKISH FRONT.

LT. L. J. PELLAT, R.A.F., sends us a few interesting notes regarding motor cycling on the Turkish Front. He says: "After our train journey from Archangel to Vladikavkas, we started over the Caucasus mountains by road, passing through Tiflis and Alexandropol to Kars. This took us about eight days.

"During the journey we had a few troubles with the cars. Then we fell back on the Douglas motor cycles, which came in very useful for fetching spares, escorting the cars, etc. When we reached Kars we had two days' stay, and then started for Turkey in Asia. Some of the 'roads' there were atrocious and almost impassable because of the sand.

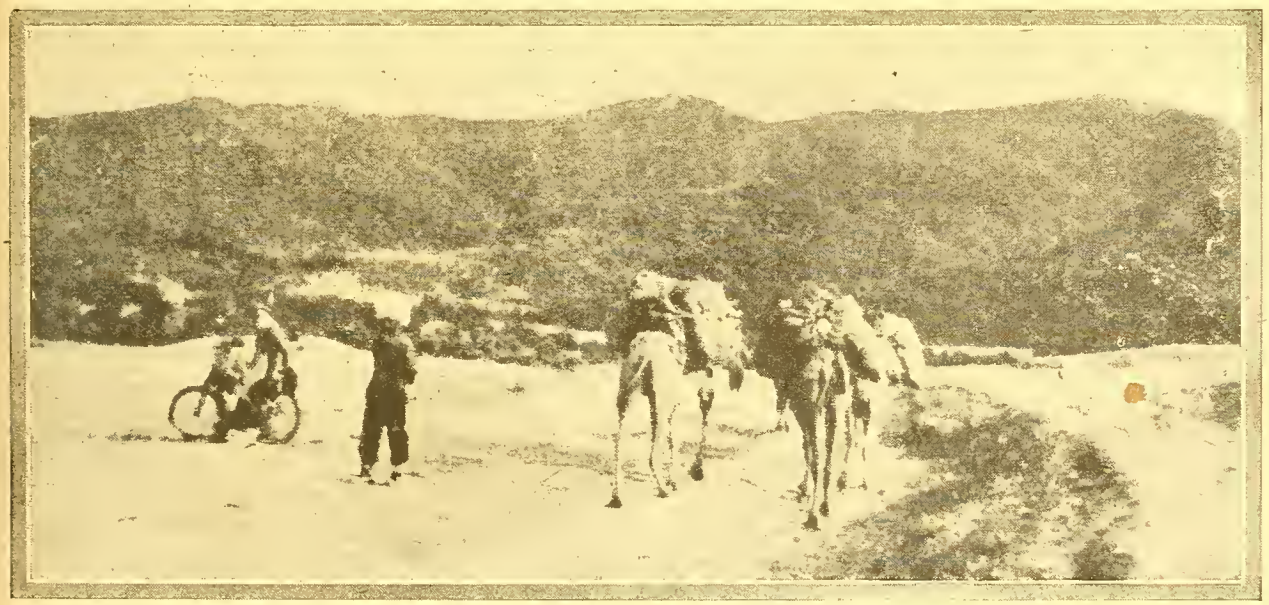
"One day we sent a cycle out with a spare part for a car some miles away, but it returned, being unable to pass over the sand. Then a light lorry was sent, and that came to grief as well. We waited all night until some Armenians came by, who lent ten horses to pull it out. Some of the cycles got as far as Lake Van, Turkey in Asia."

"VENUS" AND "ADONIS."

A CAPTAIN in the A.S.C. signing himself "Adonis" writes in reply to "Venus":

"I had been wondering for some time how long it would be before the Gunner D.R. decided to 'hold forth' on his prowess. I see at last that one has fallen, and wish to protest against his statement that, when he requires any repairs or bits, he has to go 'anywhere between four and forty kilometres.'

"As a 'big noise,' as far as M.T. used by the R.G.A. for several months, I emphatically state that I have never known workshops, A.S.C., more than fifteen kilometres from the line when working for R.G.A. in action."

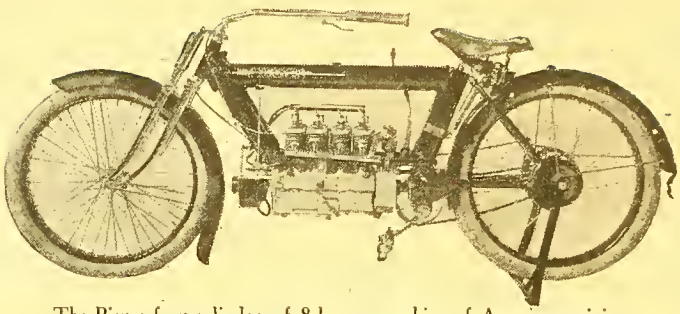


A scene in the Caucasus Mountains. The photograph was taken by Lt. L. J. Pellat whilst on his journey from Vladikavkas *via* Tiflis to Kars.

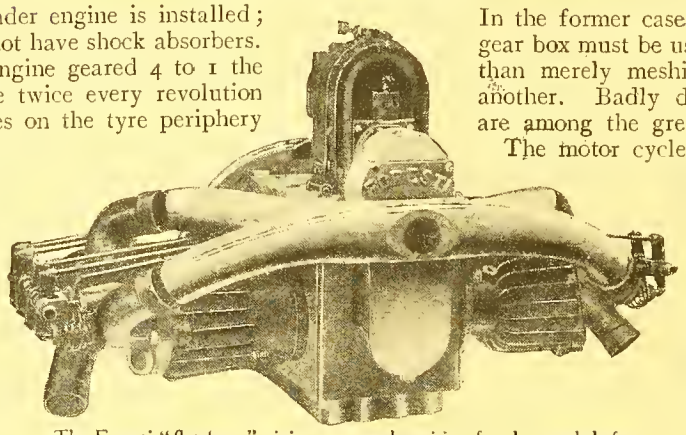
giving an impulse every half revolution. It will be clear even to the novice that in a four-stroke engine with four cylinders one quarter the size of the single the undulations in the line would not be so prominent. One can well understand that the shock absorber problem loses its importance when a four-cylinder engine is installed; beyond the clutch, cars do not have shock absorbers.

With a single-cylinder engine geared 4 to 1 the rear tyre feels the impulse twice every revolution—that is to say, two places on the tyre periphery less than one-sixteenth of its circumference in length have to take all the drive. In a four-cylinder engine the drive is approximately one-quarter the force, but applies the power on the tyre eight times each revolution. In mentioning these facts, it is not intended that they should be regarded as a condemnation of the single-cylinder. We all know that, formidable as is the chain pull variation of the single-cylinder motor cycle, it does not inconvenience us seriously. It is there all the same, and the four-cylinder engine, while not removing it, reduces it to the minimum, for, although in a four-cylinder engine there are two impulses per revolution, one has lost its power before the next one comes into force.

In a six-cylinder engine this small gap is reduced, but it requires an eight or a twelve-cylinder engine to provide a real overlap. With the reintroduction of the vertical four-cylinder motor cycle a different transmission system has to be considered. Whether the chain, as fitted on the American Henderson, is used, or a shaft transmission, as on the F.N. and most other four-cylinder designs, is decided upon, the drive has to be changed from one direction to another. In the former case a bevel or a worm at the gear box must be used. There is more in this than merely meshing one bevel wheel with another. Badly designed and fitted bevels are among the greatest power eaters.



The Pierce four-cylinder, of 8 h.p., a machine of American origin, possessing several unusual features.



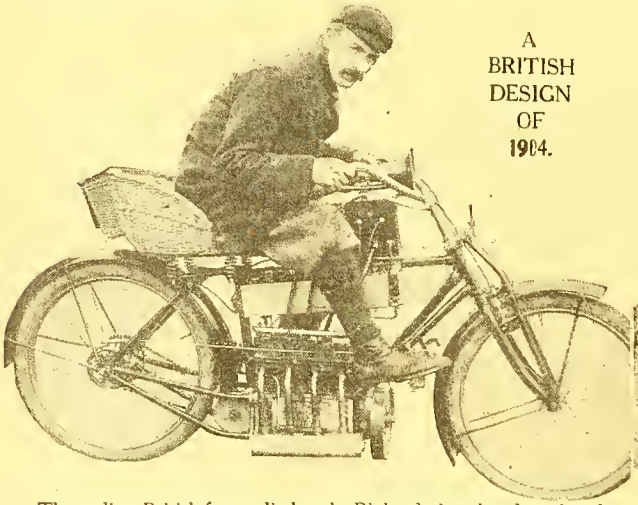
The Foresti "flat four," giving a normal position for the crankshaft.

The motor cycle designer has not the advantage enjoyed by his brother in the car field, who can take this drive in a direct line from the engine to the bevel in the differential casing of the axle. In a motor cycle, if the engine is placed on the centre line of the machine, the drive first has to be transferred to another line parallel to it, alongside the rear wheel. Therefore with shaft drive even the top gear is not "direct," as on a belt or chain-driven machine of conventional design, or through one bevel, as on a car. It has to pass through a spur wheel also.

Probably this is the reason why the chain is favoured as the transmission medium on the Henderson. Here the drive is transferred from the longitudinal to the transverse direction by a bevel in the gear box which is integral with the engine.

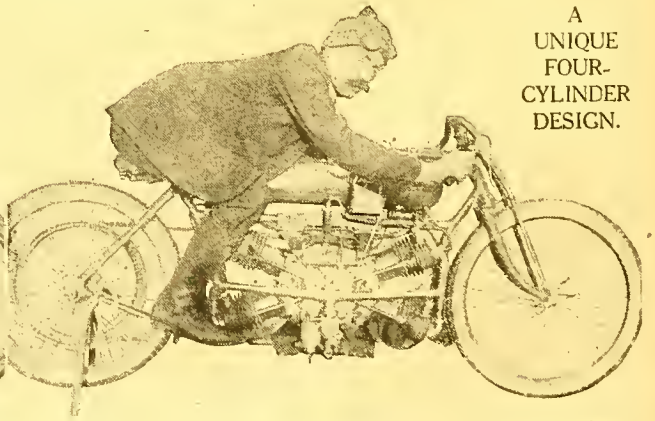
It would be a pity if a good four-cylinder motor cycle were spoiled by fitting a faulty transmission. As motor cycle designers have had more experience with the chain, they may be content to solve one problem at a time, and produce the engine before tackling the shaft drive proposition.

A BRITISH DESIGN OF 1904.



The earliest British four-cylinder, the Binks, designed and marketed by Messrs. Binks, Ltd., of carburetter fame. Probably the smallest four-cylinder machine made.

A UNIQUE FOUR-CYLINDER DESIGN.



An opposed V design produced some years ago in France as a racing machine.

THE MOTOR CYCLE

AVIATION SECTION

The New Uniform. A New Manufacturing Process.

A Chair of Aviation.

Sir Basil Zaharoff has offered £25,000 to the Government to found a Chair of Aviation in the University of London attached to the Imperial College of Science.

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The Theory of Flight?

"If the different forces acting on a machine in flight are known to be what they are, and if the negative lift plus the positive lift are together greater than gravity, consequently knowing that these forces are acting in conjunction or else in opposition, and taking into account the fact that if the stagger is greater or smaller than it ought to be, therefore the drift will be greater or smaller than it is; consequently, the machine will fly or not according to whether the thrust of the propeller is greater or less than these forces taken in conjunction or one after the other." From a humorous diary, by Cpl. Mee, in *Flight*.

—◇⊡◇—

The Demoiselle.

We happen to possess a copy of the first volume of "Aeronautics," edited by the scholarly Mr. J. Ledeboer. The slim book is now worth a matter of £10 or £15, and the first issue (dated December, 1907) consists of four pages only. It includes an interesting article by those stout-hearted pioneers Charles and Gabriel Voisin, an account of the coming to grief of M. Santos Dumont's baby "Demoiselle" monoplane weighing only 125 lb., and some interesting data on piriform balloons (or *ballons sondes*, as they are termed in the country of their origin) which were designed for the purpose of dispersing hail clouds by discharging explosives in their midst and thereby saving the vintage.

—◇⊡◇—

Detachable Tanks.

Apropos of the detachable petrol tank invented by Mr. Lot, which we mentioned in a recent issue, the necessity of such a device is emphasised by a story which the inventor told us. Some little time ago, while in Paris, he showed the plans to M. Eiffel, a very genius of research, and the author of "La Résistance de l'Air et l'Aviation" (which is not a book to be recommended for week-end reading). But the designer of the graceful Tour Eiffel, whose experimental machine was then nearing completion, dismissed the idea with a few felicitously worded compliments, giving it as his opinion that such a device was not really necessary. Ten days later the valuable experimental craft was burnt in just such circumstances as the detachable tank might have avoided!

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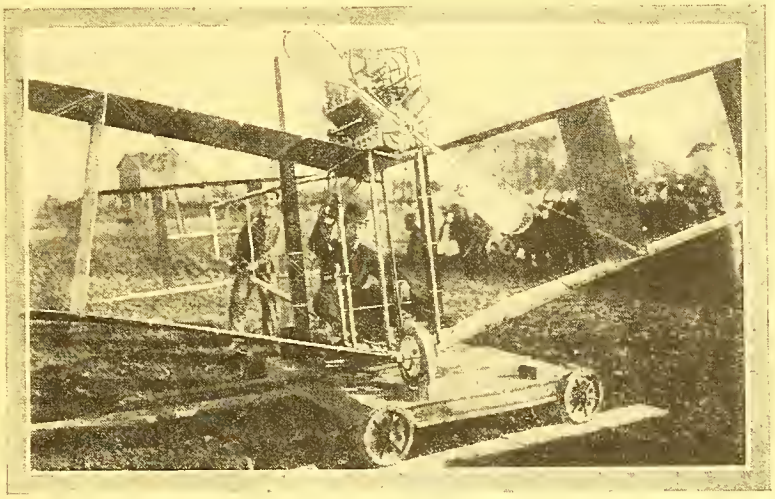
The New R.A.F. Uniform—Official Order.

The Air Ministry has now issued its official Order regarding the change in the Air Force uniform from khaki to light blue, and several minor alterations. The present khaki uniform may be worn till it requires renewal, when the new pattern light blue must be provided, but no grant will be made toward the latter. The cap will be of the present pattern, but with blue crown. The vertical bars on either side of the badge will be abolished and new designs of cap badges are issued for specified ranks. The pattern of the jacket remains unaltered, but the material is light blue cloth, and buttons, belt, and badges are all modified in some degree. Blue or grey collars with black ties, and black boots, are also authorised for specified occasions. The new uniform may be a pleasant and artistic innovation



An interesting photograph of the little "Demoiselle" machine referred to in a paragraph on this page. It was made largely of bamboo, and was powered by a Dansette-Gillet motor of about 30 h.p. M. Dumont is in the pilot's seat.

The Flying Saint.

The Air Force has adopted St. Michael as its patron saint. One young "loot," when asked who ought to be the guardian of aviators, replied, "Aaron-ought!"

—◇⊡◇—

The Internal Combustion Turbine.

Rumour—probably as reliable as usual—says that the Germans have an aeroplane driven by a gas turbine!

Gas turbine, by the way, was the name always given to that type of engine recently described in *The Motor Cycle* as the "internal combustion turbine." Both names are correct, but the latter is more communicative and accurate.

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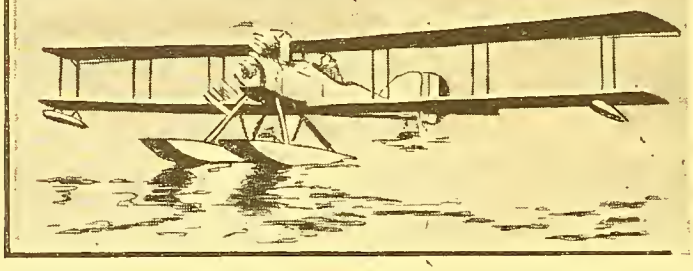
Aero Props.

The tendency at the present time is to make aeroplane propellers out of twenty layers of wood, the better to detect flaws, which occasionally escape notice when seven laminations only are used, as has been the standard practice hitherto. In the early days of aviation propellers were carved out of one piece of wood, but this gave very poor results. In modern factories machines are in use which shape as many as four propellers at a time, the cutting tool following the contours of a pattern piece. This results in an enormous saving of time, and increased accuracy, as compared with in the old days, when a skilled workman would put in long hours with a spokeshave to reduce the air-screw to the required dimensions. Metal propellers have been tried, but they gave trouble with crystallisation. Moreover, they lack the slight "whip" that is necessary to counteract the excessive strain when starting up.

Seaplane propellers have their tips sheathed in copper, to prevent their being splintered by the water. The proper waterproofing of the wood, and the search for a really satisfactory glue, have been the outstanding troubles with which makers have had to contend. Oil varnish and casein glue have done much to overcome these difficulties, but there is still very considerable scope for improvement.

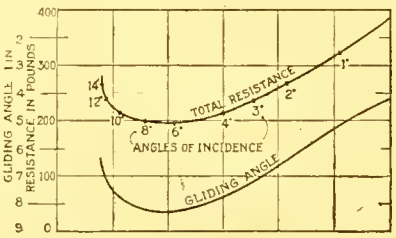
FLYING FACTS AND THEORIES



POWER & RESISTANCE. Part III.

By W. G. ASTON, A.F.Ae.S., A.M.I.A.E.

THE gliding angle of an aeroplane is the angle between the flight path and the horizontal when it is allowed to fly without engine power, or, rather, when the energy required for its forward travel is borrowed from gravity. It is evident that this gliding angle is dependent upon the ratio between the lift and the resistance, or drag, of the plane section to be considered, and that the greater this ratio is the smaller will the gliding angle be. Supposing, for instance, that the lift-drag ratio is 15, then the gliding angle will be 1 in 15 and so on, for it is obvious that if the lift force is fifteen times as great as the drag force, then the aeroplane will move vertically downwards only one foot, whilst it is travelling forwards 15ft. Now the lift-drag ratio is not in itself constant, but varies with differences in the angle of incidence of the plane. Hence such differences in angle have an immediate effect upon the gliding angle. Again, the gliding angle referred to above is concerned solely with the planes themselves, and is not concerned with the effect of the body, including struts, wiring, etc., the resistance of which has to be added to the drag of the wings. When this is done the lift-drag ratio is diminished, and consequently the gliding angle of the complete machine is considerably worse than that of the planes by themselves. Knowing the lift-drag ratio, the total wing resistance and the body resistance, the gliding angle appropriate to any angle of incidence can be plotted, and this comes out as shown in the accompanying graph. From this it will be seen that the best gliding angle occurs at an angle of incidence of between 6° and 7°, and corresponds to a forward speed of about 70ft. per second, or roughly forty-eight miles per hour. If the angle of incidence is either increased or decreased the gliding angle is reduced. Whereas at 6° it is roughly 1 in 8½, at 4° it is worse than 1 in 8, and at 1° it is 1 in 6¾, these figures representing the lift to drag ratio of the machine as a whole. If, therefore, the pilot of this particular machine found his engine failing, he would cover the greatest distance, and so have the biggest choice of landing grounds by selecting an angle of incidence of between 6° and 7°, and he would do this by adjusting his elevator control until his air speed, according to the indicator, were forty-eight miles an hour. Travelling either faster or slower would merely reduce the distance that he could glide.



Graph relating to resistance and gliding angle of aeroplanes

Now the best gliding angle of an aeroplane has an important bearing upon another matter, namely, the distance which, when the engine is running, can be covered on a given supply of fuel, or, in other words, the most economical flying speed. I have recently asked a few pilots how they would propose to fly their aeroplanes in a competition in which the winner was he who went the furthest on a tankful of "juice," other things, of course, being equal. The replies were given more or less offhand, and without very careful consideration, but they varied enormously. Some said they would go "all out" as near the ground as possible (this is highest flying speed). Others that they would throttle down and go as slowly as possible (but it does not follow that the longest *time* in the air means the greatest *distance* flown). Others said they would climb as quickly as possible up to a good height and then fly level until their petrol gave out, when they would glide down at the best angle. It is the last-named who are right, though, of course, the words "good height" require some qualification. Without going too closely into detail the matter can be approached in the following way.

Three Considerations.

Firstly with regard to aerodynamic efficiency, the best conditions are fulfilled when the aeroplane flies at an angle of incidence corresponding to that which results in the best gliding angle. Secondly with reference to the efficiency of the engine. This will give its maximum output per unit of fuel when it is running on full load, and the same applies to the efficiency of the screw propeller, which will also give its maximum efficiency when the aeroplane is moving forward as fast as possible, which, needless to say, takes place when the engine is fully opened out.

If the engine is opened fully out and the aeroplane is kept at the angle of incidence appropriate to the best gliding angle it will climb rapidly, since, as shown in the graphs given in the previous articles, there is at this point a considerable available surplus of power. As the density of the air decreases with increasing altitude the speed of the aeroplane will increase if the angle of incidence is kept the same, but, on the other hand, the reading of the air speed indicator will remain the same as it was before. Since the lift, with a constant angle of incidence, will decrease, the aeroplane will at some particular height cease to climb, although it would go up very much higher if, as I explained in my article on the effects of altitude, the angle of incidence were increased and the speed decreased.

Flying Facts and Theories.—

To cover maximum distance, therefore, the thing to do on elementary considerations is to open out the engine to its fullest extent and fly at the speed appropriate to the best gliding angle, this speed being maintained until, finishing up with a glide and with empty tanks, the machine drops to earth again. Secondary considerations may slightly modify this solution of the problem, but taken all round it is not very far from accurate.

Giant Battleplane v. Single-seater Scout.

By "TORQUE."

PERHAPS the one uncontested maxim of air-fighting is that the superiority in the air belongs to the side which can produce the best single-seater scout in sufficient numbers. Up to the present machines manned by two or more occupants have possessed a very poor chance against the enemy's scouts. The bigger machines are slower in climbing, horizontal flight and manœuvre. These deficiencies more than balance their extra armament and gunners. They can neither force a fight with scouts, nor break it off at their pleasure. When a fight is once joined, their slowness is a grave handicap, for which the extra gunner, or gunners, is but poor compensation. They can seldom get more than one gunner in action simultaneously against a single adversary. The front gunner is at a disadvantage, because he cannot manœuvre half so well as his scout assailant; the other gunners have no personal control of the aeroplane, must guess what their pilot is going to do, and have to operate their gun mountings very intelligently indeed.

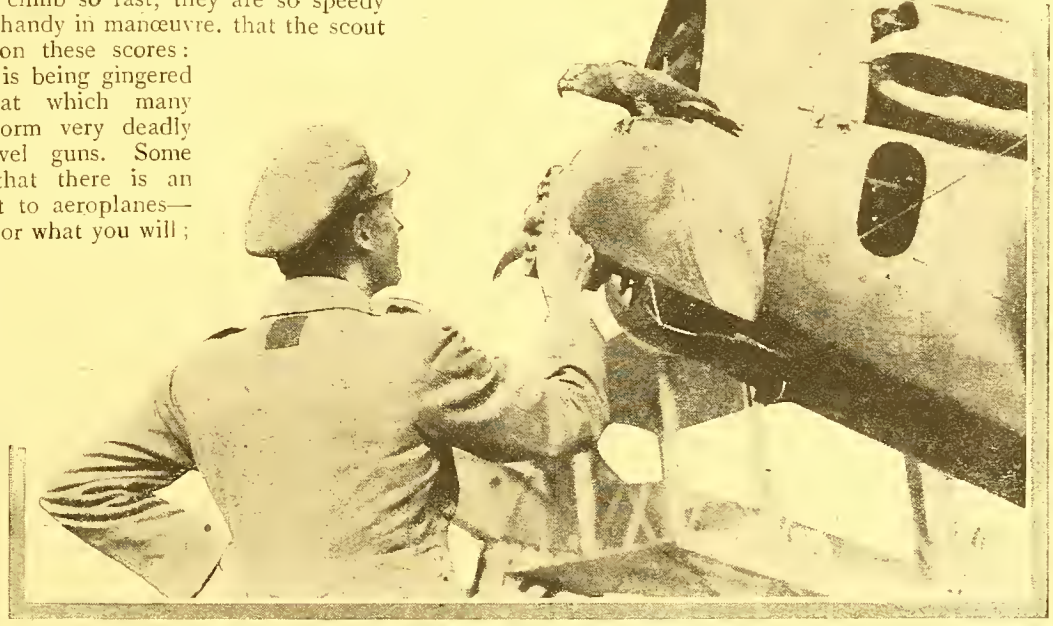
Consequently a belligerent who can dictate the course of battle to his enemy's scouts, and keep a few scouts in reserve to attack his enemy's reconnaissance machines, is likely to have a joyful time in the air.

It will be interesting to see how long this law holds good. Already some of the bigger machines are becoming awkward propositions for scouts to tackle in daylight. They climb so fast, they are so speedy on the level and so handy in manœuvre, that the scout has little vantage on these scores: and aerial gunnery is being gingered up to a point at which many observers can perform very deadly shooting with swivel guns. Some authorities assert that there is an intrinsic speed limit to aeroplanes—set it at 200 m.p.h. or what you will; that pilots will be unable to handle scouts capable of more than a certain speed; and that two, three, four—or, if you like, ten—seated machines will ultimately reach this same standard of performance. If that day comes, giant battleplane and single-seater scout will compete on level terms in respect of speed and manœuvre, but the giant machine will retain its superiority of fire. Then the mastery of the scout would vanish.

Formation fighting hardly affects the issue, because machines cannot keep formation in a scrap. Every set battle between formations presently dissolves into a "dog fight," when the calibre of individual fighters sooner or later tells its tale.

On the other hand, the bigger the machine, the bigger the gun it can carry. The Hun has already introduced aeroplane guns which fire small shells. The machine-gun may soon be as ineffectual in the air as the 1914 observer's rifle or revolver would be to-day. Big battleplanes may eventually mount guns which would be a cross between a field gun and a blunderbus. No scout of the present type could approach within range of such a weapon. Without the aid of shell-firing guns, a formation of giant battleplanes could annihilate any flight of scouts no more speedy or manœuvrable than themselves, simply by sheer superiority of concentrated fire.

It seems probable that the aerial fleets of the future will resemble naval fleets. The battle will be joined by outpost screens of light craft, scouts figuring as destroyers. Behind them will come the cruising two and four-seaters; but the battle will not be clinched until the Dreadnoughts open their long-range fire.



The O.C. of a famous R.A.F. fighting squadron in France with his mascot—a parrot.

LETTERS to the EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

A BROKEN COTTER.

Sir,—Many thanks for your prompt reply to my query. It put me on the right track, and my theory turned out wrong. I found all correct in the timing gear and magneto. The trouble was partly hidden, and was so simple—when found of course.

The cotter under the inlet valve spring cup had got broken, completely smashed, and had damaged the underside of the cup. The spring and cup were only held in position by the fragments of the broken cotter, and thus caused the irregular working of the inlet valve. I renewed both, and now all is O.K. A. HANDFORD.

THE AMERICAN GALLON.

Sir,—In your article on "Consumption Trials," on page 33 of your issue of July 11th, you omit to notice the fact that the American gallon is equivalent to only 231 cubic inches, and therefore is smaller than the imperial gallon of 277.278 cubic inches, so that to convert the figures of miles per American gallon to miles per imperial gallon they should be multiplied by 1.2.

Most of your readers will be unaware of this, and will therefore misinterpret the results.

May I point out that this is another argument in favour of the adoption of the metric system, by the use of which such confusion would be avoided?

HAROLD DEANE.

ROAD CONDITIONS.

Sir,—The letter from "Sufferer" in your issue of July 18th confirms my own experience of the road from Bromley to Westerham Hill; but has he tried Gunnersbury Lane? The people responsible for its upkeep should be condemned to motor cycle along it every day until it is repaired! If all the roads were in as good condition as that from Kew Bridge to Richmond is now, there would be no need for spring frames.

My impression is that the motor 'buses do not do a hundredth part as much harm to road surfaces as do the service lorries, because the Bromley to Westerham Hill road was quite respectable before the war. H.J.W.

Borehamwood.

Sir,—I see that in *The Motor Cycle* of July 18th a correspondent has drawn attention to the shocking state of the road between Bromley and Westerham. This route, *viâ* Keston Mark, has been in a very bad condition for a considerable time past owing to the Bromley to Westerham 'bus service which runs over it.

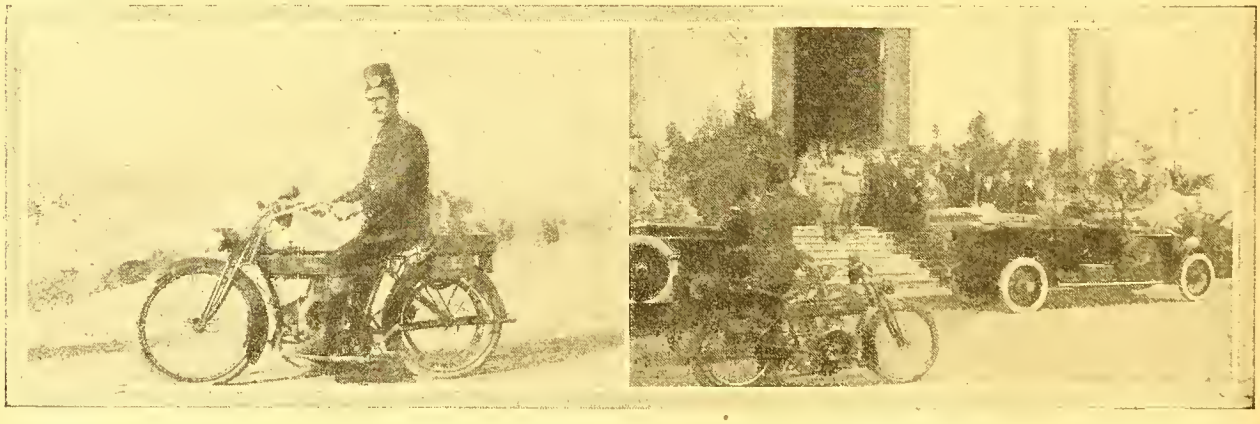
The road through Hayes and Keston village, however, was until recently in perfect condition. Now it is nearly as bad as the other. This is mainly owing to the large number of Army lorries which are driven over it at an excessive speed. It seems to me that if the police could spare some of their valuable time (from, say, persecuting private motorists) for trapping some of these lorries, they would be doing a good work. No country roads will remain in good condition long when 3 ton lorries are driven over them at between 20 to 25 m.p.h., as I have frequently seen them being driven on the slope between Keston and Hayes. I refuse to believe that there is need for lorries to be driven at such speeds. They do more harm to the roads when driven thus than any number of cars could do. As a proof of this witness the very large amount of motor traffic which used this road during the week-ends previous to the war. The road in those days, however, was always in a good condition and hardly ever in need of repairs. A. ARNOLD.

EXPLOSION PRESSURE AND VIBRATION.

Sir,—I may be wrong, but it has always struck me that the vibration on a vertical single is emphasised by the fact that when an explosion occurs in a confined space it naturally exerts an even pushing effect in all directions. The kick on firing a rifle illustrates this. To refer to the single again, does not the explosion exert a small lifting effect on the machine *re* the cylinder? I should say that the best position for a single is horizontally forward of the crank case. While upon the subject, does not the rear cylinder of a horizontal twin produce a somewhat braking effect upon the engine in the same manner? Summing up, I should say the most convenient position is that employed on the P. and M.

To my knowledge this subject has not been broached before, and I should like to know what others think.

R. W. CLARKSON.



(Right) One of H.H. the Sultan of Egypt's bodyguard mounted on a Douglas motor cycle. (Left) The Sultan visiting the Cairo Museum His Highness is seen speaking to the director of the museum. The bodyguards are on the left of the picture with Douglas motor cycles.

THE FUTURE OF BENZOLE.

Sir,—I read with pleasure your article on benzole. I used benzole when I could get it before the war, and found it more economical than petrol. I could get more m.p.g. out of it, and should always use it if I could get a good supply in the future. I believe there will be more of my class (workers) motoring after the war, and there will be a greater demand for fuel, so I sincerely hope there will be something done to obtain the best fuel. In any case, the motorist wants to stop the Oil Ring getting a strangle hold on the benzole.

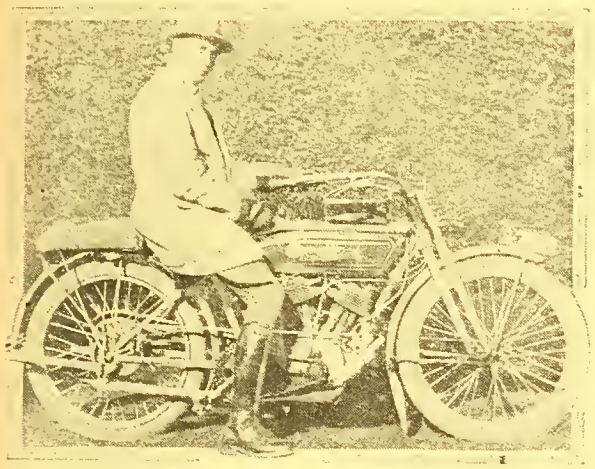
I cannot understand why more working men do not motor; it is not expensive, and I am sure it is the most charming pastime there is. Motor cycling holds a charm not known to the non-motorist. I am waiting patiently for peace, so that I can start again. I am a railway employee, and get cheap fares on the railway, but I prefer the old motor cycle and the open road to the stuffy train.

I must thank *The Motor Cycle* and "Motor Cycles and How to Manage Them" for my knowledge of how to obtain a nice week-end in peace time. I may say my mount is a 4 h.p. Zenith and sidecar. I can get 60 m.p.g. with wife and child. WORKER.

Wellington.

AN EXECUTIVE OFFICER'S MOUNT.

Sir,—I send herewith a photograph of my 10 h.p. Reading-Standard motor cycle, which I use daily, as Executive Officer of the West Perthshire District Agricultural Executive Committee, in connection with the Increased Food Production Scheme.



An executive officer's mount See letter from Mr. David Paterson.

My district includes ten parishes, the roads in which are mostly steep and rough, and they prove an excellent testing ground for a motor cycle.

I have nothing but praise for my present mount, which has now a large mileage to its credit, and which has never once left me stranded from home. The engine is very flexible, and no trouble is experienced in driving through traffic, and on the open road it is capable of attaining any speed desired. DAVID PATERSON.

RICHTHOFEN'S DIARY.

Sir,—In reply to Lt. R. G. McLeod's statement in *The Motor Cycle* for July 18th, that Baron Richthofen was shot down by machine gunners of an artillery battery, may I be permitted to take up a few lines of *The Motor Cycle* to repeat the statement of a well-known Air Board lecturer at a lecture given to people directly interested in the aircraft trade only?

The Baron was on patrol with his "circus" when an English two-seater was spotted at a lower altitude. Carrying out their usual tactics, the "circus" went ahead, leaving Richthofen to account for the English 'bus. He dived for the tail of the latter, whose pilot was quite unaware of the fact. At this moment two English scout patrols spotted the manœuvre, and dived from opposite directions for the German. Both flights opened fire on him simultaneously with the battery gunners, and the Baron went down in a nose dive without firing a round, being so intent on the two-seater that he did not observe the scouts on his tail.

Both flights and the machine gunners claimed to have shot him down, but it was afterwards definitely proved that the scouts shot him down (I forget which at the moment, although the types of machines were stated) by the direction from which the bullet entered his body.

J. SAMPSON (Lt.),
Late Dorsetshire Regt. and R.F.C.

TO HELP THE WAR LOAN.

Sir,—In your "Current Chat" of July 18th you refer to vaporisers and to railway fares. I might say, after fitting a vaporiser of my own make, I ran on paraffin for two years, and by saving railway fares I was able to pay £53 into War Loans; but as I was stopped from using my machine last September, of course the War Loan had to stop. To-day, if I were allowed to use one gallon of paraffin a week, I could pay 10s. a week into War Loan. Does the Government realise this, or is it content to save a shilling and lose eighteenpence?

King's Lynn. ENGINEER.

PETROL FOR SOLDIERS.

Sir,—I have just had my monthly bunch of *The Motor Cycle* sent to me, and I notice that in the number dated July 4th you state that petrol licences are only granted to men on leave after either service Overseas or treatment in hospitals. For the benefit of those concerned, may I point out that this statement is incorrect? Petrol licences are granted to men on leave from active service, and it may be news to your readers that there are scores of pilots and men on active service in Great Britain. My fellow officers and myself never have any difficulty in getting petrol licences when on leave, although we have not been outside this country in our lives.

Another point worth considering is that the Navy, although technically "Overseas," is not so in the popular meaning of the word; yet naval officers and men can obtain petrol licences when on leave.

ANTI-SUBMARINE PATROL, R.A.F.

DIFFICULTY IN STARTING.

Sir,—Seeing the letter from "S.O.S." (Morecambe) *re* Connaught two-stroke in *The Motor Cycle* of July 18th, and having had a similar trouble, I think the following facts may interest your correspondent.

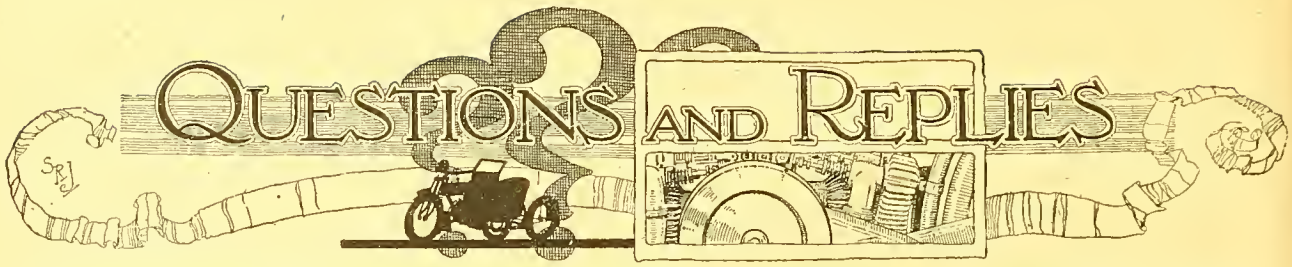
First—Bad starting: Remove the wire gauze from the air intake on Amac carburetter, and he will find his starting trouble vanish. Second—Back wheel stopping when decompressor lever is released (I take it he refers to the release valve): This trouble he will find disappear, after removing the gauze from the carburetter, as the engine was not getting the correct mixture. The above cured my troubles, and they have not recurred. I may also add I have had the greatest satisfaction from a Sphinx four-point plug.

Third—*Re* fitting a clutch: This I did with a Villiers free engine hub, which is the correct size for the back forks, but your correspondent will find everything has to be reversed. The brake which operates on the left has to be transferred to the right side; also he must fit a separate brake drum. He will also have a difficulty in finding a suitable place for the foot control if he wishes to retain it (I may say handle-bar lever control is out of the question), as it will interfere with the brake when it is transferred from the left side.

I overcame the above difficulties as follows: Reverse the brake bolt, and control the brake with a wire, fitting a spring from the brake shoe to the carrier to hold it off the brake drum. Fit a long handle to the footrest bolt, get a small piece of sheet steel with a piece of angle iron attached on top with two notches in it, and fit this on the inside of the handle on the footrest bolt. This he will find much better, I think, than the foot control. The steel plate he must secure to the footrests; this I did by tapering the footrest ¼in., and fitting bolt through plate and footrest.

JOHN FAIRBROTHER.

A letter despatched by us on March 30th to Pte. W. B. Roberts (155,089), S Section, Second Heavy Repair Shop, 320 Company, M.T., A.S.C., has been returned marked "Present location uncertain."



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Truing a Belt Rim.

I should be obliged if you could give me some "tips" *re* truing a belt rim (for brake). The rim itself appears true, as the diameters taken from many points agree, but the setting is out, both up and down and right and left. I can build and true a wheel, but this belt rim beats me.—W.H.M.

We think you must be wrong in your measurements of the belt rim, as if this is actually quite true, we do not very well see why any special difficulty should occur in truing up in the wheel. You do not say if the wheel itself is perfectly true. If it is not, this, of course, would explain the difficulty.

Breaking Flywheel Key.

I have a Levis 2¾ h.p. motor cycle with a two-speed Albion gear box, chain driven. Every day I go out, as a rule, the flywheel key breaks, although I keep the lock nut tightened with a hammer and cold chisel. Can you suggest a remedy?—F.C.S

The flywheel key must be faulty, or the flywheel cannot be a good fit on its shaft. Mere tightening of the nut will not make the flywheel secure if it is a faulty fit. The use of the hammer and cold chisel may have something to do with your trouble. It is a very bad habit.

Fitting a Hub Gear.

I have a twin-cylinder motor cycle, single gear, belt drive, outside flywheel, not suitable for countershaft gear. I wish to have the frame altered to take hub gear. Please help me with the address of a good firm for altering the frame. The reason I ask is that I have had frames altered before, and had two spoilt. In one of them the track of the back wheel was 1⅞in. out with the track of the front.—W.H.

We do not think that this frame conversion can be carried out with real satisfaction by anyone other than the makers of the motor cycle. You say that you have already had frames altered and have had trouble with them, and we think you always will have, as fundamental alteration of a frame is seldom a satisfactory job. You will find it very difficult indeed to get any capable firm to undertake the work at the present time, and you are more likely to meet with success if you apply to some small local repairer.

Hub Gears Again.

A friend who has a lightweight three-speed (Armstrong) Hobart is experiencing the following trouble: When pedalled to start, after a turn or two a grating noise will occur and the back wheel will continue to revolve, but the belt rim attached to the back wheel will stop. The engine will not fire, but I presume that is due to being unable to pedal it enough to start the engine. Would you please say what is wrong and what is the remedy?—T.B.

Evidently the gear is not adjusted properly. Place the gear in neutral and adjust the control rod until the gear is perfectly free, the clutch, of course, being in at the time. The gear, if in order, will then enable you to start without difficulty.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Over-oiling in Rear Cylinder.

I have a twin-cylinder 2¾ h.p. Royal Enfield motor bicycle, and I am having a little trouble with it. I have had it taken to pieces and cleaned it thoroughly throughout. The fault is this: When it is in motion the back piston throws oil upwards on to the sparking plug, and causes it to misfire. The front cylinder is all right, and is in good order. I have had new piston rings put in. The magneto is all right, and the wires from the magneto to the sparking plugs are in good condition.—I.J.

The fault of which you complain is not an uncommon one in twin-cylinder motor cycle engines. The only cure is to fit baffle plates in the crank case, as these prevent excessive oil from reaching the back cylinder. The new rings should help to cure the trouble, and probably there will be an improvement after the engine has run a little longer. The back cylinder gets more oil than the front owing to the direction of rotation of the engine, which causes more oil to be projected to the rear. The use of a plug-adapter might help you.

Use of Petrol.

I applied for a petrol permit for domestic and business purposes, and, through the help of the A.C.U., I obtained a permit for two gallons per month. It states on the permit that the petrol can only be used for purposes of Clause 3a. What I should like to know is, am I only allowed to use petrol for domestic purposes, or can I use it for domestic *and* business purposes? Can I use it for the purpose of fetching a sidecar which I have purchased?—C.E.

If the petrol was issued to you for one single purpose only, you would certainly be acting illegally if you used it for any other purpose. You may use it for fetching the sidecar you have purchased, provided the journey is not more than ten miles each way.

RECOMMENDED ROUTES.

BRISTOL TO BEAMINSTER.—E.K.

Bristol, Pensford, Chewton Mendip, Wells, Glastonbury, Ilchester, Crewkerne, Beaminster.

WOLVERHAMPTON TO BLACKPOOL.—G.H.H.

Wolverhampton, Newport, Fernhill, Whitchurch, Tarporley, Warrington, Wigan, Preston, Kirkham, Blackpool.

RINGWOOD TO KEIGHLEY.—H.W.

Ringwood, Cadnam, Ower, Romsey, Winchester, Whitchurch, Newbury, East Ilsley, Abingdon, Oxford, Baynards Green, Brackley, Northampton, Kettering, Stamford, Grantham, Newark, Retford, Bawtry, Doncaster, Ferrybridge, Aberford, two miles south of Wetherby turn left and go through Harewood, Otley, Ilkley, to Keighley. Approximately 265 miles.

BIRMINGHAM TO LONDON (CLAPHAM JUNCTION).—F.W.E.

Birmingham, Coventry, Daventry, Weedon, Towcester, Stony Stratford, Fenny Stratford, Dunstable, St. Albans, Barnet, Finchley, Regent's Park, Baker Street, Orchard Street, Grosvenor Place, Buckingham Palace Road, Royal Hospital Road, Albert Bridge, down Albert Bridge Road, at the end of which turn right down Battersea Park Road, until you come to Falcon Road, at the end of which turn to your right. You will then come to the railway.

ACTIVE SERVICE
LIKE our splendid troops the A.V. British Magneto is always in front proving daily its wonderful reliability under most adverse conditions
A.V. Magnetos
BRITISH THROUGHOUT
A. Vandervell & Co. Ltd.
ACTON, LONDON, W.

BELDAM RETREADS

"Speaking from Experience."

"You retreaded a tyre for me about a year ago with your medium tread. It has been running continuously on the front wheel of my combination, has done 2,500 miles, and has not punctured. This, in my opinion, is a guarantee of your work and my appreciation."
P. V. B. (Portsmouth.)

're Beldam retread I had over twelve months ago, I am more than satisfied with it. I have used it practically every day, in all weathers, hail, rain, or snow, and, by the look of it now, I shall get a lot more mileage from it." *C. H. J. (Northants.)*

"I am forwarding a 26 x 2¼in. tyre for retreading, and may state that I have had tyres retreaded by you, and have found them equal to a new tyre in wear."
B. H. B. (Bedford.)

Beldam Motor Cycle Tyre All-Rubber Retreads cost from 13/- to 17/6; patching and bursts according to requirements.

The Beldam Tyre Co., Ltd.,
Brentford - - - - Middlesex.

PLAYER'S

"COUNTRY LIFE" Cigarettes

(MEDIUM STRENGTH)

Pure Virginia Tobacco

10 for 5d.
50 for 2/0½

These cigarettes are also supplied at Duty Free Rates for the purpose of gratuitous distribution to wounded Soldiers and Sailors in Hospital.

Terms and particulars on application to—

JOHN PLAYER & SONS, Nottingham.
Branch of the Imperial Tobacco Co. (of Great Britain and Ireland), Ltd.
P784

In answering these advertisements it is desirable to mention "The Motor Cycle." B27

MISCELLANEOUS ADVERTISEMENTS.

IMPORTANT NOTICE.

Owing to the August Holidays, the issue of "The Motor Cycle" for August 8th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, August 1st.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisemeot. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisemeat is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

1914 Abingdon, T.T. model, 3½h.p., 3-speed, very fast; £35.—86, High Rd., Lee. [7095

ABINGDON King Dick, 1915, 3½h.p., countershaft and 3 speeds, chain and belt, just overhauled, new piston, bushes, belt, ample spares; £50.—Balchin, 43, Hendford Hill, Yeovil. [X6695

A.J.S.

A.J.S., 6h.p., countershaft, kick, hand clutch; £36; exchange.—24, Beauval Rd., East Dulwich. [7152

A.J.S. Combinations, 6h.p., 1918 models, new; what offers?—Attwood's Garage, Eccleshall, Staffs. [X6596

Forward Facts No. 5.

It's the little things that worry, but the faulty fastener does more —it may hold you up for hours!

Contemplate the irritation that ensues, and then cut the risk by the purchase of a

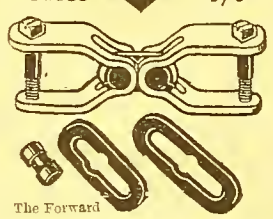
FORWARD

"the fastener that never fail's."

There are reasons. Let us tell you all about them.

FORWARD MOTOR CO., Forward Works, Summer Row, B'HAM.

Price 1/6



The Forward

r682.

MAGNETO REPAIRS

and spare parts

We are well qualified to undertake the repair of Magnetos of all makes, and to supply spare parts, being, as we are, one of the most experienced firms manufacturing Magnetos

SIMMS MOTOR UNITS, LTD., Percy Buildings, Gresse Street, London. W.1.

ROSCO CYLINDER BLACK.

PRESERVES YOUR CYLINDERS.

Tins, 6d. Withstands Heat Post Free, 8½d.
Tins, 1/- Post Free, 1/3½

Sole Manufacturers:

OWEN BROS., HULL, Eng.

Dixie magnetos

DIXIE

American Supplies Co. Ltd 162 Grt. Portland St. London W1

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 19: always have dependable second-hand machines. [53

A.J.S.—Immediate delivery of Military Model, 70(80 tyres, detachable wheels; £91/6.—Exeter Mot Cycle Co., Ltd., Bath Rd., Exeter. [35

A.J.S.—We have six 1915 and 1916 A.J.S. combin tions on offer. See our displayed advert, page 13 Maudes', 100, Gt. Portland St., London, W.1. [X67

A.J.S. 4h.p. Combination, 1915½, hood, screen, lam good tyres, 4,000, good condition; £65, or neares machine separate £55.—Milner, Burtrey House, Haw [X65

A.J.S., 1913-14, 2¾h.p., 2-speed, C.S. clutch, £3 1914 3-speed and kick-starter, £42/10: 19 6h.p. combination, £67/10; E.P. or exchange.—Servi Co., 292, High Holborn, London. [66

A.J.S. Spares; prompt delivery. — Cyril William Chapel Ash Depot, Wolverhampton. [49

Alldays.

1918 Alldays Allon, Model de Luxe, 2-speed, a clutch, K.S., 2¾h.p.; £57.—Ross, 86, High R Lee, S.E. [709

2¾h.p. Allon 2-stroke, 2 speeds, hand clutch, bong new March, not done 200 miles, unscratched; £4(must sell.—Box 2,151, c/o *The Motor Cycle.* [X668

Ariel.

JONES'S Garage.—Ariel special agents; spares stocke —Broadway, Muswell Hill, London. [712

CROW Bros., Guildford, Ariel agents.—New and ore hauled second-hand models in stock. [537

1915 Ariel Combination, 3-speed countershaft, speed ometer, lamps, horn, spares; £48.—23, Highat Rd., Rushden, Northants. [X669

3½h.p. Ariel Combination, 1914 model, fitted wit handsome coachbuilt sidecar, dustproof mag. countershaft, 3-speed gear, and clutch, and kick starter all accessories, and speedometer, with several tools an spares; bargain, £60; guaranteed.—Wauchope's, 9, Sho Lane, London. [721

Auto-Wheels.

AUTO-WHEEL and Lady's B.S.A. bicycle, latte specially built for Auto; price £16. Addison Scott Sandy Lane, Cheam, Surrey. [X661

Bat.

1915 Bat 8h.p. Combination, 3-speed, K.S.; £68.— 86, High Rd., Lee, S.E. [709

Blumfield.

1914 Blumfield Combination, 6h.p., 3-speed; £50.— 86, High Rd., Lee. [709

Bradbury.

BRADBURY, 1914-15, 4h.p., 2-speed gear box, all-chain, kick, 85 m.p.g.; £28/10; owner discharged soldier unable to ride.—194, Plaistow Rd., West Ham, London, E.15. [7184

BRADBURY 4h.p. 1913-14 Coachbuilt Combination, 3-speed, clutch, lately overhauled by Bradbury agent, cost over £10 overhaul; receipt shown; genuine bargain, £28/10; trial by appointment.—25, Strafford Rd., Acton. [7166

Brown.

BROWN, 2¾h.p., B.B. mag., new Palmer covers, etc.; £12/10.—30, Pelly Rd., Plaistow, E.13. [7090

B.S.A.

JONES'S Garage.—B.S.A. special agency; many spares stocked.—Broadway, Muswell Hill, London. [712

MOTOR CYCLES FOR SALE.

B.S.A.

1916 B.S.A., Model K., fully equipped, with or without conchbuilt sidecar, perfect condition.—Coiffin, Holwell, Sherborne. [X6658

B.S.A., late 1914, 4½h.p., very little used, as new, Lucas accessories, tools, etc.; sacrifice £25.—4, Gleathorne Rd., Kingston-on-Thames. [7113

B.S.A., 3½h.p., 1913, 2-speed, Millford coachbuilt sidecar, new condition, been carefully used; £38.—Fawkes, 177, Haydons Rd., Wimbledon. [X6708

B.S.A. Motor Cycle, 1915, Model K., with Millford sidecar, kept in splendid condition, and as good as new; owner a prisoner of war; £65, or nearest offer.—Barty, Stone St., Gravesend. [X6674

1915 B.S.A., 4½h.p., all-chain drive, and luxurious conchbuilt sidecar, upholstered in Bedford cord, Lucas dynamo lighting and horn, speedometer, wind screen, splendid condition throughout; £70.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C. [X6679

1913 B.S.A., 3-speed Sturmey-Archer gear, new tyres, pear-shaped cylinder, recently thoroughly overhauled by makers and re-enamelled at cost of £12, accept £26/10; approval; accept lady's and gent's bicycle and cash.—185, Brighton Rd., South Croydon. [X6702

Calthorpe.

1916 Calthorpe, 2-stroke, lamps and horn; £30.—Parker and Son, St. Ives, Hunts. [7200

CALTHORPE 2-stroke, 2-speed, perfect, excellent bargain, £26/10.—Locke, Draper, Penge. [7144

CALTHORPE Lightweight, 2½h.p. J.A.P., 2-speed gear; £24.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3523

2¾h.p. Calthorpe-Jap, 1916, fully equipped, reliable lightweight machine; £27/10; guaranteed.—Wauchope's, 9, Shoe Lane, London. [7211

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

LATE 1915 Calthorpe-Jap, 2-speed, lamps, horn, new Clincher tyre, excellent condition; £21, or exchange for good type machine and cash, or bicycle.—O. Jones, Waterloo House, 51, High St., Holywell. [X6510

Chater-Lea.

1915 7-9h.p. Chater-Lea Combination, in nice order; £55.—86, High Rd., Lee. [7099

CHATER-LEA Combination, 8h.p., 3 speeds, chain drive, lamps, speedometer; £45, quick sale.—Chapman, Highbridge St., Waltham Abbey. [7158

Chater-Jap.

1914 4h.p. T.T. Chater J.A.P., Druids, Senspray, Bosch, specially tuned, whole machine as new, spares; £30, no offers.—Deakins, 173, Roslyn Rd., Avenue Rd., S. Tottenham. [7075

Clyno.

CLYNO, 6h.p., 2-speed, in nice order; £25.—86, High Rd., Lee, S.E. [7100

2½h.p. Clyno, 2-speed, 2-stroke model; £22/10.—Wauchope's, 9, Shoe Lane, London. [7223

1914 6h.p. Clyno Combination, like new, 3-speed, kick starter, spare interchangeable wheel; 60 gns.; wanted, Henderson combination, not later 1915 or 1916.—Pirie, Cranleigh. [7202

CLYNO, 2¾h.p., 1914, 2-stroke, 2 speeds, speedometer, Klaxon horn, acetylene lamps, in good condition throughout; bargain, £17/10.—Rowe, 140, Church Rd., Hove, Brighton. [7083

CLYNO 1914 Combination, 6h.p. twin, 3 speeds, detachable wheels and spare, hood, lamps, speedometer, horn, tools, new tyres, hardly used, splendid condition, just overhauled; lowest £69.—Temple, White Cottage, Potters Bar. [7174

Coventry Eagle.

COVENTRY Eagle, 2½h.p., 2-stroke, 2-speed; cost 42 gns.; only ridden 140 miles; must sell; £36.—F.G., 61, Algernon Rd., Lewisham, S.E.13. [7155

Douglas.

DOUGLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749

DOUGLAS, 1914, 2¾h.p., 2-speed, good condition; £32.—Chapman, Highbridge St., Waltham Abbey. [7157

4h.p. Douglas, 2-speed, 1914 model, accessories included; £52/10.—Wauchope's, 9, Shoe Lane, London. [7225

2¾h.p. Douglas, accessories, 2 speeds; bargain, £27/10; sound machine.—Wauchope's, 9, Shoe Lane, London. [7224

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS, 2¾h.p., 2-speed, 1912, recently overhauled, perfect condition, fast; bargain, £23.—Box 2,137, c/o *The Motor Cycle*. [X6518

DOUGLAS, 1914-15, T.T., in thorough good condition and running order; cheap, 35 gns.—Red Deer Garage, South Croydon. [7169

1914 3½h.p. Douglas and Sidecar, K.S. and clutch, in good condition; 40 gns.—Ratcliffe, 1, Maple St., Gt. Harwood, Blackburn. [X6516

M · M · M

List of reliable overhauled Second-hand Models, ready for immediate use and sale. No releases are required, and we could deliver by road if required.

Where a date of manufacture is given, this is guaranteed correct.

RUNABOUTS AND CARS.

MORGAN, 1916, Grand Prix J.A.P., just overhauled by the makers, hood, screen, 80 mm. tyres, lamps, horn, disc wheels, royal blue finish £135
MORGAN, 1916, Grand Prix M.A.G., screen, electric lamps, disc wheels, low mileage, grey finish £140
MORGAN, 1914, Grand Prix J.A.P., 80 mm. tyres, hood, screen, lamps, speedometer, nice order .. £100
MORGAN, 1916, Grand Prix, Lucas dynamo lighting, discs, hood and screen, speedometer, 80 mm. tyres, red finish £150
MORGAN, 1916, similar to above, but less Lucas dynamo set £130
PEUGEOT, 6 h.p., 1916 model, standard model with sporting body ..... Low price.
SUNBEAM, 12-16 h.p., open 5-seater touring car, detachable wheels and spare. As new £325
MORRIS-OXFORD, 10 h.p., 1914, special sporting model, bucket seats, speedometer, and revolution counter, hood and screen. Like new £220
LA PONETTE, 1914, 10-12 h.p., Ballot engine, detachable wheels and spare; only done about 1,000 miles. Excellent condition £175
TALBOT special 25-50 h.p. sporting 3-seater and dickey, about the fastest car on the road to-day £675

SIDECAR COMBINATIONS.

A.B.C., 1915, 4-speed model, spring frame, Sidecar, and all accessories ..... —
ENFIELD 1915 (very late) 6 h.p. Combination, standard, and never done 1,000 miles. As new £75
ENFIELD 1915 (delivered 1916) 6 h.p. Combination, all accessories, including mechanical horn £70
ENFIELD 1917 8 h.p. Combination; £20 worth of accessories fitted £88
SUNBEAM 1914 6 h.p. Combination, Gloria coachbuilt Sidecar, all accessories including speedometer £70
DOUGLAS 1915 4 h.p. Combination, 3-speed and kick-starter. Just overhauled £65
ZENITH, 1914, 4-5 h.p., Gradua countershaft gear, Canoelet Sidecar £45
ROVER, 1916, 3½ h.p., countershaft, 3-speed, Rover Sidecar, splendid condition £58
A.J.S. 1916 6 h.p. Combination, detachable wheels and spare, Lucas dynamo lighting, speedometer, and electric horn. Equal to new £110
A.J.S. 1916 6 h.p. Combination, similar to above, but less Lucas dynamo set £95
We have 4 more 1915 **A.J.S. Combinations** coming into stock during the next week.

SOLO MACHINES.

RUDGE, 3½ h.p., special Isle of Man model, foot oiler and dropped frame £40
TRIUMPH, 4 h.p., 1914, 3-speed, all accessories, including speedometer £38
ROVER, 1915, 3½ h.p., T.T., hand-operated Philipson pulley, speedometer, lamps, etc. Like new £40
ENFIELD, 1916, 2¼ h.p., 2-speed, 2-stroke; like new. Small mileage £40
DOUGLAS, 1915, 2¾ h.p., 3-speed, kick-starter and clutch. All accessories £49
DOUGLAS, 1914, 2¾ h.p., 2-speed and clutch; appearance rather poor, but good mechanical order .. £30
TRIUMPH, 1913, 3½ h.p., clutch model; just overhauled, but requires assembly £20
ZENITH, special T.T. model, with overhead valve, 90×77½ twin J.A.P. engine, disc wheels, like new —
LUGTON, 1914, 3½ h.p. Precision engine; a gift at .. £18
ENFIELD, 1912, 2¾ h.p., 2-speed, chain drive £21
RUDGE, 1912, 3½ h.p., just overhauled £20
TRIUMPH, 1908, 3½ h.p., standard, delivered 1909 .. £17

Exchanges Made on any of Above.

Maudes' Motor Mart

100, Great Portland St. LONDON, W.1.

Telephone: 552 Mayfair.
Telegrams: "Abdicate, Wesdo, London."

MOTOR CYCLES FOR SALE.

Douglas.

JONES'S Garage.—Douglas agents; plenty of spares stock; second-hand machines, 1912 £25, 1914 £33.—Broadway, Muswell Hill, London. [7126

DOUGLAS.—We have three Douglas machines on offer. See displayed advert., page 13.—Maudes', 100, Gt. Portland St., London, W.1. [X6727

DOUGLAS, 2¾h.p., 1915, W.D. model, only done 100 miles, excellent condition; £50, or offer.—Fraser, 70, Highbridge St., Waltham Abbey. [7230

DOUGLAS Motor Cycles.—We can supply by return 1918 models on receipt of permit.—Eli Clark, the Douglas agent, 196, Cheltenham Rd., Bristol. [0923

DOUGLAS.—New models supplied on receipt of permit; also 1914 2-speed, 3½ gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [7003

DOUGLAS, 8h.p., air-cooled, 2-speed gear, chain drive, kick starter, 16 gn. new coach sidecar, looks new; any trial; £68.—Apply, Burnham, 179, Balham St., Plaistow. [7037

1913 2¾h.p. Douglas, 2-speed, clutch, kick starter, lamps, generator, and mechanical horn, tyres and belt almost new, unused last 2½ years; bargain, £28/10, no offers.—Whale, 56, Townshend Rd., N.W.8. [7239

1918 4h.p. Douglas with Sidecar, 2 lamps, horn, tools, etc., very low mileage, in exceptional condition throughout, equal to new, mechanically perfect; £105.—Robinson's Garage, Green St., Cambridge. [7194

1918 2¾h.p. Douglas Motor Bicycles, brand new, for immediate delivery, models W clutch, U touring, V T.T., against Priority Permit only. Write for particulars how and where to obtain one.—Douglas Specialists, Robinson's Garage, Green St., Cambridge. [7192

Enfield.

JONES'S Garage.—Enfield agency; spares in stock; 1916 S.H. combination, £75.—Broadway, Muswell Hill, London. [7127

ENFIELD 3h.p. Twin, 66 gns.; touring and TT models in stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3522

1917 Enfield 6h.p. Coach Combination, splendid order; £86.—Harland, Lane End Farm, Hartshead, near Ashton-under-Lyne. [7173

ENFIELD, 1915, 3h.p., 2-speed, kick start, Lucas lamp set, Watford speedometer, fine condition, £35.—85, Dalberg Rd., Brixton, S.W.2. [7172

WAUCHOPE'S can supply 3h.p. Royal Enfields from £17/10, fitted with twin-cyl. engines.—Wauchope's, 9, Shoe Lane, Fleet St., London. [7226

ENFIELD.—We have five Enfield combinations and solo models on offer. See displayed advertisement page 13.—Maudes', 100, Gt. Portland St., London, W.1. [X6728

ENFIELD Combination, 6h.p., late 1916, new tyres, very little used, good as new; any trial; £75, no offers.—Orton, Beechwood, Hale Lane, Mill Hill, N.W.7. [7199

LATE 1916 Enfield Combination, 6h.p., lamps, horn, screen, very good condition throughout; £75.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [X6683

ENFIELD 1915 6h.p. Combination, £75; 1916 ditto, £84; E.P. or exchange; new models can be supplied with permit.—Service Co., 292, High Holborn, London. [6626

ROYAL Enfield, 6h.p., 1914, fitted with 1915 sidecar, complete with electric lights, luggage grid, machine in perfect order; any trial; £55.—M.K., 61, Drakefield Rd., Balham, S.W. [7159

WAUCHOPE'S have the largest stock of Enfield combinations, from £50, 1917 models, and dynamo lighting models; on view; ready for the road.—Apply, 9, Shoe Lane, Fleet St., London. [7227

6h.p. 1916 Enfield Combination, fitted with a handsome reliable 2-seated sidecar, hood and screen, lamps, and tools, most excellent condition and running order; price 90 gns.—Wauchope's, 9, Shoe Lane, London, E.C. [7226

Forward.

FORWARD, 2¾h.p. twin, 2-speed, splendid condition, fast, powerful, and easy starting; any trial; £34, or nearest offer.—Corporation Farm, Reigate [7156

F.N.

F.N., 4-cyl.; £10, or sell parts.—G. Kennard, 18, Myddelton Sq., Clerkenwell. [7150

Grandex.

2h.p. Grandex, geared pulley; £15, bargain.—Wauchope's, 9, Shoe Lane, London. [7203

1915 2½h.p. Grandex-Precision, 2-stroke, 2-speed model, almost new machine; £27/10.—Wauchope's, 9, Shoe Lane, London. [7209

Harley-Davidson.

JONES'S Garages.—Harley agents; a few spares stocked.—Broadway, Muswell Hill, London. [7128

HARLEY-DAVIDSON 1915 7-9h.p. Combination, electric; £65; E.P. or exchange.—Service Co., 292, High Holborn, London. [6627

1917 Harley-Davidson Combination, electric, paintwork unscratched, all new tyres, almost new; £125.—Hobden, Silver St., Salisbury. [7074

MOTOR CYCLES FOR SALE.

Harley-Davidson.

HARLEY Combination, August, 1916, only run 3,000, garaged last 15 months; best offer over £65.—Reply, Box L6,719, c/o *The Motor Cycle*. [6990

1915 Harley-Davidson Combination, in perfect mechanical condition, 3-speed, kick starter, Bosch mag., mechanical horn, lamps, generator, etc., just been re-enamelled, and looks as new; this machine climber Pebblecombe Hill (Dorking) in a competition at 73 m.p.h., mileage under 3,000, unused for 18 months; £65.—Whale, 56, Townshend Rd., N.W.8. [7240

Hazlewood.

HAZLEWOOD 1914 4-5h.p. Twin Combination; £42; 3-speed countershaft, speedometer, lamps, mechanical horn, splendid condition; appointment.—Weeden, 51, New Cross Rd., London, S.E. [7182

Henderson.

10 h.p. 1915 Henderson; £70; property of an officer.—Wauchope's, 9, Shoe Lane, London. [7207

Humber.

3½ h.p. Humber, 2 speeds, and coach sidecar, excellent condition; £32/10.—Westfield, Heath Hall, Dumfries. [X6654

Indian.

1915 5h.p. Red Indian, T.T. model, 3-speed, clutch; £35.—Railway Garage, Staines. [7235

1916 Indian Powerplus Combination, in perfect order throughout.—47, Streatham Hill, S.W.2. [7094

JONES'S Garage.—Indian agents; few spare left; 1915 model solo, £56; 1914 combination, £50.—Broadway, Muswell Hill, London. [7129

5 h.p. Red Indian Combination, 3-speed, 1916, three disc wheels, perfect running order; sacrifice £60, no offers.—32, King St., Leicester. [X6726

1915 5h.p. Indian, 3-speed, and clutch model, semi-T.T. bars, fast solo mount, includes accessories; £45.—Wauchope's, 9, Shoe Lane, London. [7215

INDIAN, 5h.p., 3-speed, kick start, torpedo sidecar, head lamps, speedometer, mechanical horn, wind screen, clock, and spares; £48.—Write, 16, Cecil Rd., Harlesden. [X6519

INDIAN, 5h.p., 3-speed, kick start, 2 lamps, Lucas horn, speedometer, sporting torpedo sidecar, screen, hood, clock, in perfect order; write appointment; 47 gns.—262, Blackhorse Lane, Walthamstow. [X6520

INDIAN, 1915, 5-6h.p., 3-speed clutch and kick-starter, Lucas head and rear light, mechanical horn, very nice condition; 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [7009

INDIAN Combination (W. Green), 1916. 7-9h.p., 3-speed, hand and foot clutch, hood, screen, speedometer, lamps, horn, tools, etc.; sell 70 gns., or exchange Morgan, w.c.—Upton, Langport, Som.. [7082

VERY Fast 1915-16 5h.p. Indian, 3-speed, clutch, K.S., complete with lamps and horn, only run 1,500 miles, indistinguishable from new; £48, or part exchange 2¾h.p. Douglas.—Brown, 16, Broad St., Ross-on-Wye. [X6734

7-9h.p. 1916 Powerplus Indian, 3-speed gear model, kick-starter and free engine, semi-T.T. bars, solo machine, only used just over 1,000 miles, never used for sidecar work; 70 gns.—Wauchope's, 9, Shoe Lane, London. [7210

Ixion.

1914 Ixion, 2-stroke, 2¾h.p.; £15.—86, High Rd., Lee, S.E. [7101

James.

JONES'S Garage.—James agency; few spares.—Broadway, Muswell Hill, London. [7135

4¼ h.p. James Countershaft Combination, accessories, wind screen, plating as new; £40.—28, Idlecombe Rd., Tooting. [7188

JAMES 1916 4½h.p. Combination, Lucas dynamo lighting, £75/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [6622

4¼ h.p. James and Coachbuilt Sidecar, 3-speed countershaft model, all-chain drive, clutch, and kick start; £47/10.—Wauchope's, 9, Shoe Lane, London. [7219

1916 James 3½h.p. T.T. Twin, Sensspray, 3-speed, h.b.c., kick start, chain drive, excellent tyres, lamps, speedometer; £38.—Cooper, 28, Meeting House Lanes, Brighton. [7171

Levis.

JONES'S Garage.—Levis agents; Baby Levis, 1915, £21.—Broadway, Muswell Hill, London. [7130

LEVIS, 2½h.p., 2-speed, had little wear, good as new; £25, a real bargain.—26, Stone St., Gravesend. [X6675

2½ h.p. 1915 2-stroke Levis, 2-speed model, smart machine; £25.—Wauchope's, 9, Shoe Lane, London. [7206

LEVIS, 2¼h.p., property of a schoolboy just joined up, almost brand new; price £20.—Stancliffe, Sion Hill, Thirsk. [X6309

LEVIS, latest type, 2 speeds, 2-stroke model; immediate delivery for work of National importance; £47/10.—Maudes', 100, Gt. Portland St., London, W.1. [6110

LEVIS, 2½h.p. Model E., Enfield 2-speed gear, chain drive, brand new, in stock; very special bargain, £39/15.—Wilkins, Simpson, and Co., 11, Hammersmith Rd., opposite Olympia, London. [7143

THIS WEEK'S OFFER.

T.T. ROVER, latest model, with Philipson pulley, absolutely new, engine never started up since we received it from the works. Rover's cash price £67 10s. Our special price ..... **50 gns. only.**

Also the following New Machines in stock, all of which can be supplied without permits.

NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed	44 gns
LEVIS, 2½ h.p., 2-speed	£47 10
LEVIS, 2½ h.p., 2-stroke.....	35 gns
LEVIS POPULAR, 2-stroke.....	£32 0
ROVER, W.O., 5-6 h.p. J.A.P., and Sidecar.....	£124 5
ROVER, W.O., 5-6 h.p. J.A.P., 3-speed, kick-starter.....	£97 10
ROVER, 3½ h.p., T.T., Philipson pulley	£67 10
ROVER, 3½ h.p., 3-sp., shop-soiled	66 gns

SECOND-HAND MACHINES.

1917 NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed.....	35 gns
1916 ENFIELD 3 h.p., 2-speed ..	42 gns.

JULIAN,

84, Broad Street,

READING.

Biggest Light Car and Motor Cycle Dealer in the South.
'Phone: 1024. Closed Wednesdays 1.

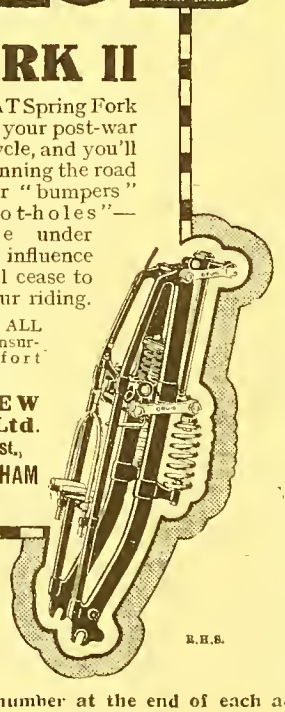
DRUID

MARK II

Get THAT Spring Fork fitted on your post-war Motor Cycle, and you'll cease scanning the road ahead for "bumpers" and "pot-holes"—because under DRUID influence these will cease to "jar" your riding.

It takes ALL shocks—ensuring comfort ALWAYS.

A. DREW & Co., Ltd.
Leopold St., BIRMINGHAM



Made in three models — for solo or sidecar.

R.H.S.

MOTOR CYCLES FOR SALE.

Levis.

LEVIS Popular, new 1917¾, done 20 miles; £25 Barfield Rd., Leytonstone, London. [7

Matchless.

JONES'S Garage.—Matchless agents; few odd sp in stock.—Broadway, Muswell Hill, London. [7

MATCHLESS Second-hand Combination; £70; 1 or exchange.—Service Co., 292, High Holb London. [6

8 h.p. Matchless Combination, splendid order, J.A engine; bargain, £30.—Bradford, 18, Pembu St., Swindon. [X6

IMMEDIATE Delivery from stock of the new W Model Matchless combination.—Elce and Co., 16, Bishopsgate Av., Camomile St., E.C.3. [X6

MATCHLESS.—Earliest deliveries in the trade 8h.p. J.A.P. War Model; exchanges arrange desired.—Maudes', 100, Gt. Portland St., London, W [6

MATCHLESS Combination, 1915 M.A.G. engine, speed countershaft gear, speedometer, lamps, h etc., tyres new, £52 cash.—Elliott, 106, Romany L Clacton-on-Sea. [X6

Minerva.

£8, bargain.—2¾h.p. Minerva, Amac, Bosch, F.I lamp, new tyres, tubes, in exceptionally good r ning order.—A. P. Sackett, 70, Norfolk Rd., Dow park Rd., Dalston, E.8. [71

Motosacoche.

1914 Motosacoche, 2¾h.p., 2-speed, £25; and 19 £35.—86, High Rd., Lee. [71

New Hudson.

NEW Hudson Combination, 3½h.p., 3 speeds, perf order; £30.—Hichens, Almer Rectory, Blandfo [X64

NEW Hudson, 2-stroke, 2-speed, about 1915, n tyres, spare belt, 2 acetylene lamps, perfect co tion; £26.—R. Hibbert, 173, Market St., Hyde, Cheshi [X66

New Imperial.

1915 New Imperial, 2-speed, 2¾h.p.; £25.—86, Hi Rd., Lee. [71

CROW Bros., Guildford.—New Imperial, all mode new and second-hand, in stock. [53

JONES'S Garage.—New Imperial agents; 1915 mod 2-speed, £29.—Broadway, Muswell Hill, Londo [71

NEW Imperial-Jap, 8h.p., 3-speed War Model co bination; 109 gns.; delivery from stock.—Exet Motor Cycle Co., Ltd., Bath Rd., Exeter. [352

NEW IMPERIAL, 2-speed, clutch, and kick-starte £54/5/6; 1916 2¾h.p., 2-speed, £30/10; E. or exchange.—Service Co., 292, High Holborn, Lo don. [662

1916 New Imperial-Jap, 2-speed countershaft, spee ometer, lamp set, fully equipped, only done 2,00 miles; bargain, £28/10.—18, South Bruton Mews, Bon St., W.1. [719

NEW Imperial Motor Cycles.—2-speed, standard, an lady's models in stock for immediate delivery; n permits required.—P. J. Evans, 91, John Bright St. Birmingham. [095

2½ h.p. New Imperial, latest model, with 2 speeds clutch, and kick starter; price £45; up to date and like new, includes accessories.—Wauchope's, 9 Shoe Lane, London. [722

Norton.

1914 T.T. Norton, 3-speed, K.S., very fast; £35.— 86, High Rd., Lee. [7104

NORTON Big Four, all chain drive; £82/10; in stock. —Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3524

1916 Norton Big Four and sporting canoelet sidecar, lamps, horn, splendid condition; £70.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [X6682

1915 Norton de Luxe Combination, 4h.p., 3-speed S.A., all spares and accessories, guaranteed perfect condition; £57.—Harold Petty, Ltd., Halford St., Leicester. [7083

1915 T.T. 3½h.p. Norton, as new, not done 1,000 miles, guaranteed perfect, a very fast machine; £45.—Harold Petty, Ltd., Norton Specialists, Halford St., Leicester. [7084

WAUCHOPE'S.—4h.p. Norton 1915 combination, Sturmey-Archer 3-speed countershaft gear, fitted with coachbuilt sidecar, combines free engine and clutch, £65; also a T.T. model, 1915, £40; and n 1916 T.T. model Norton, £58.—Seen at 9, Shoe Lane, Fleet St., London. [722

N.S.U.

HAVING Acquired the entire stock-in-trade of the N.S.U. Motor Co., Ltd., we can supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W.3. [0739

N.U.T.

1914 6h.p. T.T. N.U.T., 3 speeds and clutch, powerful sporting machine, in first-class condition; nearest £35, or exchange with cash for Powerplus Indian.—Loweth, 6, Mount Pleasant Rd., Ealing. [7093

MOTOR CYCLES FOR SALE.

O.K.

1914 O.K., 2¼h.p., 2-speed, £15; 1916 2-speed, 2¼ h.p., £20; 1915, 2¾h.p. (J.A.P.), 2-speed, £20.—Ross, 86, High Rd., Lee, S.E. [7105

P. and M.

1914 P. and M. Combination, 3½h.p., C.B. sidecar and screen, full accessories; £44.—Ross, 86, High Rd., Lee. [7106

Premier.

JONES'S Garage.—Premier agents; few spares left.—Broadway, Muswell Hill, London. [7136

3½h.p. Premier, 1913-14, good condition, lamps; £17.—Allen, Langley House, Surbiton. [7179

PREMIER, 1912, 3½h.p., and coach sidecar, Grade gear, Bosch mag., new heavy Dunlop back wheel, lamps, tools, etc., in splendid condition; a bargain, 25 gns.—49, North St., Esh Winning, Co. Durham. [X6645

Rex.

REX, 3½h.p., Bosch; £8/15.—77, Acre Lane, S.W.2. [7168

REX, 6h.p. twin, 2-speed racer; 15 gns.—11, Strathleven Rd., Brixton, London. [7167

Rex-Jap.

REX-J.A.P., 6h.p., 2-speed, new Dunlop tyres, in excellent condition; nearest to £40 accepted.—Hawley, Goodall St., Walsall. [X6704

Rover.

1914 Rover, 3½h.p., 3-speed; bargain, £34.—86, High Rd., Lee. [7107

1914 3½h.p. 3-speed Rover, lamps, horn; £38.—Parker and Son, St. Ives, Hunts. [7201

JONES'S Garage.—Rover agents; spares stocked; 1915 model, 3-speed, £33.—Broadway, Muswell Hill, London. [7137

ROVERS, 3½h.p., 3-speed countershaft gear, new; delivery from stock; what offers?—Attwood's Garage, Eccleshall, Staffs. [X6595

3½h.p. Rover, Sturmey 3-speed, just as new throughout, lamps, horn, etc., £30; sidecar, £5.—20, Forrest St., Latchford. [6871

1918 3½h.p. Rover, countershaft model, mileage 250, condition as new; 70 gns.—P. Driscoll, 58, Woodfield Rd., Ealing, W.5. [7141

ROVER 1915 Combination, 3-speed, lamps, tools, last used June, 1915, in new condition; offers.—Bram, Colin Park, Hendon, N.W.9. [7177

ROVER Motor Cycles.—3½h.p. and 5-6h.p. models in stock for immediate delivery, both solo and sidecar outfit; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0954

Royal Ruby.

ROYAL Ruby, 1917, shop-soiled, 3½h.p. J.A.P. engine, Sturmey-Archer countershaft gear, kick start, and clutch; catalogue price £72, what offers? cash or exchange lightweight, piano, or smart turnout.—Buntag's, Mason's Av., Harrow. [7231

Rudge.

1912 T.T. Rudge, 3½h.p., nice order; £16.—86, High Rd., Lee. [7108

JONES'S Garage.—Rudge agents; few spares left.—Broadway, Muswell Hill, London. [7133

RUDGE.—We have two special solo Rudges on offer. See our advert. page 13.—Maudes', 100, Gt. Portland St., London, W.1. [X6731

1915 Rudge Multi, with or without sidecar; price £30; mechanically and appearance excellent.—Morpuss, Sedgley, Dudley. [X6618

RUDGE, 1917 model, Multi gear, and free engine, fully equipped, £58; also a 1913 Rudge, single speed, £25.—Wauchope's, 9, Shoe Lane, London. [7222

1914 Rudge Multi, with nearly new coachbuilt sidecar, 3½h.p., mag., Multi gear, F.E., lamps; 35 gns.; easy terms.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [7163

RUDGE, 1913, 3½h.p., Multi, F.E., £25; ditto, 2-speed, clutch and kick-starter, sporting coachbuilt sidecar, £34/10; 1916 3½h.p. Rudge Multi and 1914 5-6h.p. ditto, £35; E.P. or exchange.—Service Co., 292, High Holborn, London. [6623

Singer.

4h.p. Singer, late 1914, and sidecar, condition as new, speedometer, lamps, etc.; price £55, bargain.—Bryant, 5, Silver St., Bradford-on-Avon. [X6642

4h.p. 1914 Singer, 2-speed and free engine model, fitted with comfortable sidecar, sound combination, reliable; £45.—Wauchope's, 9, Shoe Lane, London. [7216

Sparkbrook.

SPARKBROOKS, 2¾h.p., 2-speed models; delivery from stock; what offers?—Attwood's Garage, Eccleshall, Staffs. [X6594

1916 Sparkbrook, 2-speed, 2-stroke, tools, spares, accessories, perfect order; £30.—Robinson, Magherabeg House, Donegal. [7161

SPARKBROOK, 2¾h.p., 2 speeds, 2-stroke, usual accessories, very little used, and in beautiful condition; £22/10.—Rowe, 140, Church Rd., Hove, Brighton. [7089

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1917 **HARLEY-DAVIDSON** Combination, electric model, hood, screen, speedometer, as new	£115 0
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1916 **NORTON** Big Four and sporting Canoelet Sidecar, lamps, horn	£70 0
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1915 **B.S.A.** and Sidecar, 4¼ h.p., all-chain drive, Lucas dynamo lighting and horn, speedometer, windscreen, beautiful condition	£70 0
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1917 **NEW IMPERIAL**, lady's model, 2¾ h.p., 2-speed, and clutch, lamps, horn, as new	£40 0
1915 **ENFIELD**, 3 h.p., 2-sp., lamps, horn, good condition	£32 0
1915 **ALLDAYS ALLON**, 2¾ h.p., 2-speed, lamps	£28 0
1913 **RUDGE**, 3½ h.p., clutch model, lamps	£25 0

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'Phone: Avenue 5548.

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Sun.

SUN-VILLIERS, 1916, 2¾h.p., 2-speed, splendid condition.—Jones, 462, Lea Bridge Rd., Leyton. [7160

2-STROKE Sun-Villiers, nice little bike, fixed gear, recent year; £16, or exchanges.—185, Brighton Rd., South Croydon. [X6711

Sunbeam.

1915 Sunbeam, 3 speeds, new condition, including tyres, all accessories; £60.—Morpuss, Sedgley, Dudley. [X6617

SUNBEAM 1915, 3½h.p., with coachbuilt sidecar, £65; E.P. or exchange.—Service Co., 292, High Holborn, London. [6625

SUNBEAM, 3½h.p., 1914, solo, perfect condition; expert examination; fully equipped; £52/10.—5, St. Michael St., Penzance. [X6513

LATE 1915 Sunbeam, twin engine, 3-speed, clutch, coachbuilt sidecar, electric lights, little used; £90.—67, Grand Av., Muswell Hill, N. [6944

SUNBEAM Combination, 1915 or 1916, 3½h.p., in perfect condition, speedometer, lamps, etc.; £68.—65, Wick Rd., Brislington, Bristol. [X6691

3½h.p. Sunbeam Combination, coachbuilt sidecar, fully equipped, handsome 2-seater, best accessories; £75.—Wauchope's, 9, Shoe Lane, London. [7205

SUNBEAM.—We have two Sunbeam combinations on offer. See our displayed advertisement, page 13.—Maudes', 100, Gt. Portland St., London, W.1. [X6729

SUNBEAM Combination, 3½h.p., 1915, used month only, absolutely perfect, unscratched, mileage 500; £76.—Particulars, Martin, 34, Cook Rd., Ward End, Birmingham. [7176

1917 Sunbeam and Sidecar, 8h.p. J.A.P., W.O. Model, fully equipped with spare wheel, lamps, horn, speedometer, watch, hood, screen, mud shields; £130.—Below.

1915 Sunbeam Combination, 6h.p., hood, screen, spare wheel, Lucas dynamo lighting and horn, mudshields, speedometer; £110.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [X6681

1916 3½h.p. Sunbeam, black and gold, with Mills-Fulford coachbuilt sidecar, 2 lamps, speedometer, horn, in perfect order, very low mileage, exceptional condition; £92/10.—Robinson's Garage, Green St., Cambridge. [7193

T.D.C.

3¾h.p. T.D.C., 1914, nice machine, splendid puller, enamel, plate, good order; sacrifice £20.—Brown, Rangemore, Burton-on-Trent. [X6698

Triumph.

1914 Triumph, 4h.p., 3-speed, fine condition; £55.—86, High Rd., Lee, S.E. [7109

JONES'S Garage.—Triumph agency; plenty of spares.—Broadway, Muswell Hill, London. [7134

1912 Triumph, Grade gear, kick start, lighting set; £20.—152, Camberwell Grove, Camberwell, S.E. [7180

TRIUMPH, 4h.p., sidecar, 2 speeds, free engine, good condition; £30.—H., Bryn Menai, Sutton, Surrey. [X6693

TRIUMPH, 1913, 3½h.p., 3-speed, clutch, perfect condition; £30.—R.S.M. Comber, The Barracks, Hertford. [X6509

1914 4h.p. Triumph, 3-speed, clutch, etc., with all accessories, complete; price £35; guaranteed.—Wauchope's, 9, Shoe Lane, London. [7218

TRIUMPH.—We have three solo Trimphs on offer. See our displayed advertisement, page 13.—Maudes', 100, Gt. Portland St., London, W.1. [X6730

1913 Triumph 3½h.p. Combination, C.B. sidecar, 3 speeds, with lamps, tools, screen, and spares, in fine condition; £38.—Littlewood, Braithwell, Rotherham. [X6703

1915 4h.p. Triumph and Sidecar, 3 speeds, new condition, fitted with best accessories, including speedometer, mileage 4,730; price £50.—Douglas Morpuss, Sedgley, Dudley. [X6616

TRIUMPH, 1914, 3-speed, clutch, complete Lucas set, all accessories, as new, guaranteed perfect condition; a genuine bargain; owner must sell; £36.—S. B. Cole, 3, Grove Place, Shenley, Herts. [7072

FOR Sale, Triumph motor cycle, 1914, perfect running order, recently overhauled, new parts fitted, carrier upholstered in leather, fixed engine; £20 cash.—Apply, Davey, 53, Station Rd., Ashford, Kent. [X6613

Velocette.

1914 Velocette, 2½h.p., 2-speed, 2-stroke; £17.—86, High Rd., Lee, S.E. [7110

Williamson.

1915 Williamson, 10h.p., water-cooled combination, enclosed cab body, with side windows, new condition; £70.—Ross, 86, High Rd., Lee, S.E. [7111

Zenith.

4h.p. Zenith Combination; exchange lightweight, cash; sell £30.—69, Stocks Lane, Stalybridge. [7149

ZENITH-GRADUA, 6h.p., clutch, 1914, kick start, in splendid condition, speedometer, lamp, and accessories; £36, or near offer.—37, Boston Rd., Walthamstow, E.17. [X6653

MOTOR CYCLES FOR SALE.

Zenith.

ZENITH, 4-5h.p., late 1915, kick starter, countershaft gear, speedometer, horn, lamps, splendid order; £35, or nearest.—Coney. Gallow Hill House, Iver Heath, Uxbridge. [X6687

ZENITH, 1914, 3½h.p., Gradua gear, Millford side-car, screen, re-enamelled, looks new, exceptionally smart, new tyres; £38, offer; exchange.—24, Beauval Rd., East Dulwich. [7153

ZENITH.—We have two very fine Zenith combinations on offer at a very low price. See our displayed advertisement, page 13.—Maudes', 100, Gt. Portland St., London, W.1. [X6732

ZENITH, 1913, 4h.p. J.A.P., enclosed Bosch mag., Gradua gear, F.E., nearly new tyres, low dropped frame, runs splendidly; bargain, £19/19.—Jackson, 143, Ravensbury Rd., Earlsfield, S.W. [7173

ZENITH 8h.p. Combination, with Millford Empress c.b. sidecar, Watford speedometer, horn, Lucas lamp, in really splendid condition, £95; 4-5h.p., Gradua gear, kick-starter, in very nice condition, 55 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [7010

Miscellaneous.

MEBES and Mebes have the following motor cycles for immediate disposal at bargain prices:

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DOUGLAS, 2¾h.p., 1914, 2-speed, all accessories and spares; £40.

154-6, Great Portland St., W.1. Tel.: 3426 Mayfair. [6837

MOTOR Agents.—I have in stock for immediate delivery new motor cycles: Rover, New Imperial, Calthorpe, James, Connaught, and Hockley. No permits required. Let me quote.—P. J. Evans, 91, John Bright St., Birmingham. [0957

SPECIAL Bargains.—7-9h.p. Harley-Davidson 1915 combination, £59/15; 1915 4¼h.p. B.S.A., with B.S.A. sidecar, £49/15; 1914 4¼h.p. B.S.A. combination, £39/15; 6h.p. 1914 Zenith, latest countershaft gear, £29/15; 3½h.p. 1912 Rudge, Grado gear, £16/15; 6h.p. 1913 Rudge, Multi gear, big single, £29/15; 4h.p. 1911 Bradbury combination, £18/15; 6h.p. 1909 Rex, £11/15; 3½h.p. 1910 Rex, low riding position, £11/15; 3½h.p. 1911 Humber, 2 speeds, £18/15; 2½h.p. 1914 T.D.C. two-stroke lightweight, £11/15; 2¾h.p. 1915 T.D.C., £13/15; 2¾h.p. 1916 T.D.C., £15/15; 2¾h.p. 1910 Douglas, free engine, £12/15; 2¾h.p. 1915 Douglas, 2 speeds, £32/15; 8h.p. 1911 Bat-Jap, spring frame, 3 speeds, £19/15; send stamp for detailed list.—Booths Motories, Portland Place, Halifax. Tel.: 1062. [6609

BARGAINS.—Our premises will shortly be taken for munitions, and the whole of our stock must be cleared. Close cash offers considered. 1915 A.J.S., £79/10; 3½h.p. Auto Motor, Bosch mag., £7/10; 3½h.p. A.S.L., £14/10; 1914 6h.p. Bradbury and sidecar, £55; 1913 3½h.p. 3-speed Bradbury, £29/10; 2¾h.p. Diamond, £25/10; 1913 2-speed Douglas, £29/10; 1914 2-speed Douglas, £34/10; 1915 6h.p. Enfield combination, £72/10; 1916 model, £82/10; 3½h.p. Humber, £13/10; 1916 Harley-Davidson combination, £82/10; 1915 combination, £69/10; 7-9h.p. twin Indian, £23/10; 4h.p., 2 speeds, £22/10; 1914 7-9h.p. Indian and sidecar, £49/10; 1914 6h.p. Lincoln-Elk and sidecar, £45; 3½h.p. N.S.U. and new sidecar, £26/10; 1915 2-speed Radco, £22/10; 3½h.p. 2-speed Roach and new coach sidecar, £24/10; 5-6h.p. Rudge Multi and sidecar, £45; 3½h.p. Tourist Rex, £12/10; 2¾h.p. 3-speed Rex, £22/10; 2-speed twin Rex, £18/10; 6h.p. Rex twin, m.o.v., £14/10; 1914 6h.p. Rex and coach sidecar, £46/10; 2h.p. 2-speed Velocette, £25/10; 2¾ h.p. 1915 2-speed kick start Welt. £27/10; 6h.p. Zenith-Gradua and sporting coach sidecar, smart lot, £35; 8h.p. Morgan, hood, screen, lamps, £72/10; 1914 Perry, 2-seater, £125.—Motor Exchange, 68, Horton St., Halifax. [7139

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4. **BRADBURY**, 1914, 4 h.p., 3-speed, coachbuilt Combination ..... 35 gns.
5. **CALTHORPE-J.A.P.**, new 1918, 2¾ h.p., 2-speed £44 2
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10. **ENFIELD**, 1916, 3 h.p., 2-speed, as new 39 gns.
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SWAN Coachbuilt Sidecar, nice condition, nearly n 26×2¼ tyre and tube, 3-point coupling, fit a ordinary motor cycle; £7/10.—185, Brighton Rd., Sou Croydon. [X67

BASTONE'S for Sidecars and Bodies.—Vario models in stock; inspection invited; right price —228, Pentonville Rd., King's Cross, London, N. Tel.: 2481 North. [66

SIDECARS.—New Swan torpedo, £25; new Rov £26; new James canoelet, £18/18; new Sunbea £20/15; or by extended payments.—Service Co., 29 High Holborn, W.C.1. [662

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CORONET Sidecars, to fit any make of machine; few shop-soiled models to be sold at special price Stamp for list.—Booths Motories, Halifax. [661

CARS FOR SALE.

10 h.p. Humberette, water-cooled model, fully equipped 100 gns.—Wauchope's, 9, Shoe Lane, London. [721

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G.W.K. Light Car, 1914 model, complete as makers specification, just repainted and overhauled: £120 —Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [095

WE have the following cars for sale for cash, ex tended payments, or your motor cycle in ex change; Enfield, Alldays, R.M.C., Humberette, Horst mann.—Full particulars on application.—Service Co. 292, High Holborn, London. [X473

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£2,000 Worth of Fresh Cars this Week.—16h.p. N.A.G chassis, 4-cyl., mag., S.U., 815 tyres, £25; 20-30 h.p. Beeston Humber 25-cwt. van, gate, dual, Zenith £35; 1-ton chain-driven van, handsome roomy body £35; 15h.p. Express 4-seater, low flush-sided body mag., Solex,, pulls splendidly, smart, £40; 15h.p. Stude baker 1912 torpedo, monobloc, dual, gate, smart, £45; 8-10h.p. Unique 4-wheel parcel lorry, late model, £50. —Cox.

£2,000 Worth New Arrivals Here.—12h.p. 1914 Buck-ingham cycle car, streamline 3-seater, all aluminium, £50; 18-22h.p. Bedford-Buick light lorry, gate, dual, £50; 15-20h.p. K.R.I.T. torpedo, monobloc. gate, Claudel, £65; 14-16h.p. Belsize 15-cwt. van, gate, roomy body, £65; 17h.p. live axle Daimler ¾ landaulet, Zenith, £75; 15h.p. Racing Car, actual Brooklands winner, 70 m.p.h., skeleton streamline 2-seater, £75; 15h.p. Charron chassis, live axle, monobloc, Bosch, Zenith, £80; 15.9 h.p. Gregoire chassis, gate, Zenith, £85; 14-16h.p. Darracq, traveller's omnibus, 4-cyl. monobloc, gate, Zenith, £85; Alldays Midget, £90.—Cox.

£2,000 Worth Fresh Ones.—13.9h.p. 1912 Darracq 4-seater, enclosed overhead inlets, gate, Zenith, £100; 2-ton Berliet chassis, twin solids, long wheelbase, £100; Freehold Thames Bungalow Plot, Sunbury, £100; 10h.p. 1914 Lagonda coupe, 4-cyl. monobloc, detachable Sankeys, worm, cantilever, smart, £120; 30h.p. National sporting 4-seater, £125; Type TM Daimler 4-stretcher ambulance, £125; 11.9h.p. 1916-17 Argo ultra-sporting 4-seater, electric starter, dynamo lighting, disc wheels, monobloc, particularly posh, £135; 8-10h.p. Pearson-Cox steam light car, streamline 2-seater, paraffin fuel, exceptional condition, £135; 10h.p. 1914 Deemster streamline 2-3-seater, 4-cyl., pointed radiator, detachable wheels, smart, £145; 20h.p. B.S.A. chassis, gate, Bosch, Claudel, runs nicely, £150; 12h.p. Siddeley-Deasy torpedo, worm drive, enclosed valves, detachable wheels, £165.—Cox.

£2,000 Worth Additions.—11.9h.p. Belsize streamline 2-3-seater, dynamo lighting, monobloc, detachables, smart, £185; 15-cwt. Studebaker van, £185; practically new £450 American farm tractor, special this, £185; 15.9h.p. Star ¾ landaulet, detachable wheels, enclosed valves, long-stroke engine, late model, £235; 16-20h.p. Sunbeam 5-seater, enclosed valves, detachable wheels, Bosch, Claudel, 4-speed, £285; 3-ton latest type De Dion commercial chassis, worm drive, enclosed valves, steel wheels, £300; 15-22h.p. R.M.C., underslung, with luxurious English streamline interior-drive saloon body, seats 4, armchair seats, dynamo lighting, detachables, fine car, £350; 3-ton De Dion commercial chassis, similar to above, but better condition, worm drive, £385; 16h.p. Sunbeam streamline torpedo, dynamo lighting, monobloc engine, enclosed valves, detachable wheels, runs splendidly, £385.—Cox.

£2,000 the Lot.—Douglas S. Cox, the Motor Clearing House, 6c, Lonsdowne Hill, West Norwood, S.E., has all the above cars actually in stock and on view. Please call. Hours 8 to 6.30; Saturdays 2. No business Sundays. All dates quoted above guaranteed accurate. Where no dates quoted they have not been confirmed. Open to buy a few good cars, and prices must be very right. [7013

SELL or Exchange for combination and cash, Overland 16-20h.p. car, about 1913-14, flat top lorry body, 3-speed and reverse, fine car, sound condition, Stepney, lamps, speedometer, etc.; £100, a bargain; no further use for same.—185, Brighton Rd., South Croydon. [X6710

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Benzole after the War.

WE recently issued appeals for action to be taken now to ensure a market for benzole after the war. These appeals were contained in the leading articles in our issues of July 11th and 18th, the first one containing a general view of the situation, and the second one advocating that the present was the time for action, and that a very promising course for action was the obtaining of pledges of potential fuel users that they would purchase certain stated quantities of benzole for a certain period when it should be available and at a certain fixed price. We also appealed to our contemporaries and to the motoring organisations to consider our suggestions, and, if possible, to lend their aid in giving them publicity and carrying them into effect.

Some comments, however, have appeared in a contemporary that point to the fact that the idea needs amplification and explanation, although we should have supposed that it was self-explanatory. For instance, it is suggested that it would be somewhat hard that motorists should be compelled to purchase benzole at 2s. a gallon under their guarantee supposing that the price of petrol should be reduced to the unlikely figure of 1s. 6d. A little thought will show the hollowness of such reasoning. We may take it for granted that the petrol companies will not reduce their prices in so drastic a manner unless they are compelled to do so by some force outside their own control. One such force would be an ample supply of a rival fuel, in which case the reduction of price to a figure below that of the rival fuel might be made for two reasons: (1) to compete on favourable terms with the other fuel, and (2) to force the other fuel off the market or into their own hands. In the latter case, do motorists suppose that the price of petrol will remain at a low figure? It is therefore to the obvious advantage of motorists to do all in their power to secure an adequate supply of benzole. Moreover, it would still be to their advantage to continue the purchase of benzole, even if the price were higher than that of petrol, to enable the benzole producers to keep their product on the market, and thus keep the petrol price at a reasonable figure.

The question therefore is not so much whether benzole shall be bought at 2s. rather than petrol at 1s. 6d., but whether benzole at 2s. is preferable to petrol at 3s. 6d. or thereabouts? The mean man, of course, may leave it to others to give the necessary guarantee and take every advantage that he can, but we hope that not many motorists are capable of this.

In the matter of tax the advantage is all on the side of benzole, but we do not wish to make a strong point of this fact because it may be altered at any time.

One question asked is "Where is the guarantee that these pledges would be implemented?" It is understood, surely, that when the majority of Britishers make a pledge it is at least kind to assume that they intend to abide by it.

"Should a man die, will the pledge be a charge on his estate?" The same law that applies to other contracts must apply here.

"And if the petrol companies—horrid thought!—should adopt the un-English expedient of lowering their prices to beat benzole out of the market, what is the precise value of these pledges?" This question contains a very unworthy suggestion. In other words, the pledges may be sound so long as they are unnecessary—so long as benzole is cheaper than petrol—when they become necessary they will collapse. The whole point of the pledges, of course, would be that they would render futile any efforts towards price-cutting and so driving benzole off the market on the part of the petrol ring.

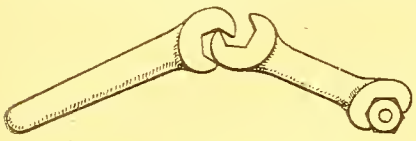
Without being fatuously optimistic, we would like to be charitable, and would prefer to regard men, even if they are motorists, as something better than unscrupulousness personified until they have proved themselves unworthy of our opinion.

An index to the advertisements in this issue will be found on the page facing the back cover

IDEAS: Useful and Ingenious.

SPANNERS.

A TIP for obtaining extra leverage with the short spanners usually supplied with motor cycle tool kits is to use two spanners in the manner

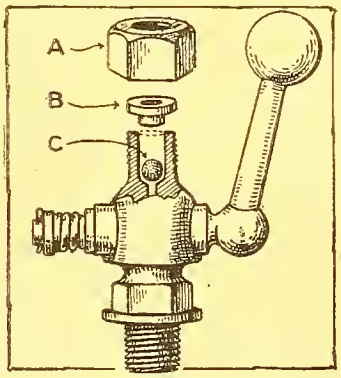


To obtain extra leverage with small spanner.

illustrated. This also allows comparatively inaccessible nuts to be reached.—E. STEVENS (Sagami).

A SIMPLE HOME-MADE DECOMPRESSOR.

THREAD the top of the compression tap to take the union nut A, then fit the brass shoulder plug B. By adjusting the union nut the movement of the steel valve ball C can be regulated.

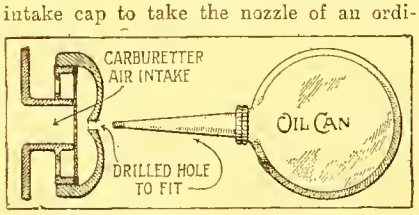


Converting compression tap to decompressor.

When the tap is "open" it will act as a double release valve, facilitating starting up of fairly high compression engines.—P. J. BOSWELL (Kenley).

EASY STARTING TIP.

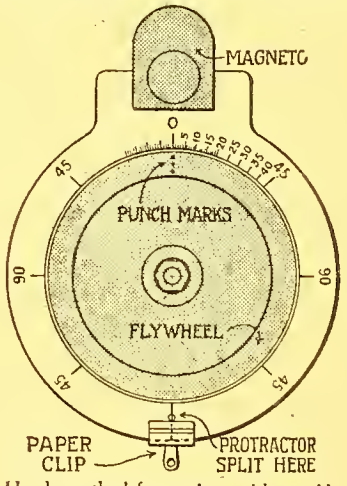
THIS alteration was carried out to a 1917 B. and B. carburetter, but will prove advantageous on other makes. Drill a hole in the centre of the air intake cap to take the nozzle of an ordinary oilcan. When starting up fill the oilcan with petrol and place the nozzle in the hole. Engage low gear and open air and throttle levers wide, then turn the engine over compression at the same time, with valve lifter raised, and inject with the free hand two or three squirts of petrol. Close air lever fully and throttle to half open, and the engine should fire first pull over.—ALLON (Oldham).



Novel injecting device.

PROTRACTOR FOR ENGINE TIMING.

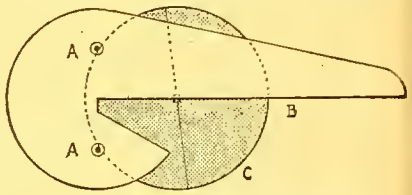
A SIMPLE and accurate method of timing engines fitted with outside flywheel is to use a protractor, as shown in sketch. The protractor is made of white card, marked in degrees and split at one point to enable it to be slipped over the driving chain or other obstruction. A paper clip secures the joint when the protractor is in position. In order to keep the protractor in a vertical position and prevent it from rotating with the flywheel, a projection is formed to fit the magneto platform or any other available fixed point. The flywheel should bear punch marks which when in the highest position indicate that, on a single-cylinder machine, the piston is at the top of its stroke; on a flat twin, that both pistons are at the top; and on a V twin, that one predetermined piston (say the rear) is at the top of its stroke. The protractor should closely encircle the flywheel, and, by noting the position of the valves with reference to the punch marks on the flywheel, an accurate timing diagram can be made.—E.S.



Handy method for engines with outside flywheels.

HOW TO FIND THE CENTRE

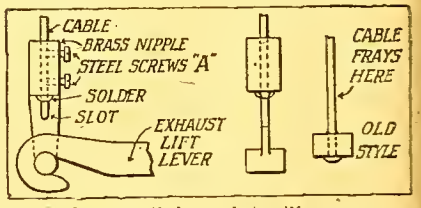
MAKE a device, preferably cut out of sheet metal, similar to the illustration. The line B if produced must bisect the line joining the two pegs A at right angles. Moreover, this line must be absolutely dead straight, and must be tested with a straight-edge after filing. The two pegs may be nails soldered into the metal. If the tool is then laid across a circular object C and the pegs pushed up tightly against the edge, a fine may be drawn along the straight portion, and the device then placed in another position and another line drawn. The point where these two lines intersect is the centre of the circle.—From the *Amateur Mechanic*.



To find centre of circular object.

NIPPLE FOR BOWDEN WIRE.

THE nipple illustrated is designed to replace the ordinary soldered type and to be carried as a spare. With the old style nipple the Bowden wire was found to fray against the edge of the exhaust lift lever, but with the new nipple fraying is impossible. For roadside repairs no solder need be nsed. The two small screws A are tightened on the inserted wire, which is thus held quite firmly. As, however, the wire tends to snap after long service at the points of contact with the screws, soldering is recommended for a permanent workshop job; the ends of the wire being splayed out in the usual way and secured with a blob of solder.—E. STEVENS.



Nipple applied to exhaust lift lever.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Contributions will be paid for at our usual rates. Rough sketches will suffice.

An Alternative to the Two-stroke.

I HAVE already expressed my opinion that (*a*) the lightweight is bound to develop, (*b*) expensive four-strokes de luxe offer the best immediate solution, and (*c*) perfected two-strokes suggest a final solution of the cheap lightweight. We must not forget that it is possible to manufacture high efficiency engines cheaply. This happens to be the problem which the Yankees faced when they started on the Liberty engine. On the one hand, they had huge works accustomed to the quantity production of engines which in many cases had not even stood in the third grade. On the other hand, America stood in urgent need of thousands of aero engines, *i.e.*, engines closely resembling the special racing car type, which had previously been a hand-made job for a few picked shops in the whole world. Whether the Liberty engine is a success or not does not affect my point. For the first time in history we see a great engineering nation facing a new proposition—the production of fine work in huge quantities by ordinary factories. (Ford, remember, is making some Liberty bits.) If Rolls-Royce, for example, were to market a 1¾ h.p. bicycle at £75, and it were to initiate a lightweight boom, the Liberty problem would be repeated on a smaller scale: and it would be solved.

The Meccano Cycle Car.

A READER asks me to place a suggestion of his before the firms who market components. He points out that thousands of impecunious men have learnt something about fitting during the war, and will remain inveterate tinkerers when it is over. They will not have a great supply of money to splash. They own no lathes or drilling machines. They are mostly married. Dozens of this reader's friends are talking of "building" cycle cars after the war, but when their use of the word "building" is analysed, it boils down to assembling purchased parts, with very little real "fitting" or "machining" in the job. His boy is a Meccano enthusiast, and he pleads that Chater-Lea or Brown Bros. or Wrigley's should plan out sets of cycle car components on bolt-up Meccano principles, so that the home-made enthusiast could rig up a two-seater to suit his own fancy. The idea sounds rather chimerical until one considers the constructional system of the frame of the Scott Sociable. If young hopeful waxes plumb batty about Meccano toys, I can quite believe that paterfamilias would raise quite a sheaf of Treasury notes to buy a pukka Meccano outfit, and construct his own tandem torpedo cycle car, with his pet type of engine in the snout thereof, and laced canvas bodywork over a plywood or wire fuselage. Of course, two or three strengths would be needed, as the worst of the backyard erector is that his fancy ranges from 3½ h.p. up to 20 h.p. I believe the idea is feasible, and that there may be money in it for any component firm which can execute it brainily. The axles would be the only really expensive item, apart from the engine: and there would be plenty of scope for individual originality in plotting out dimensions and details.

"Seizing" an Engine.

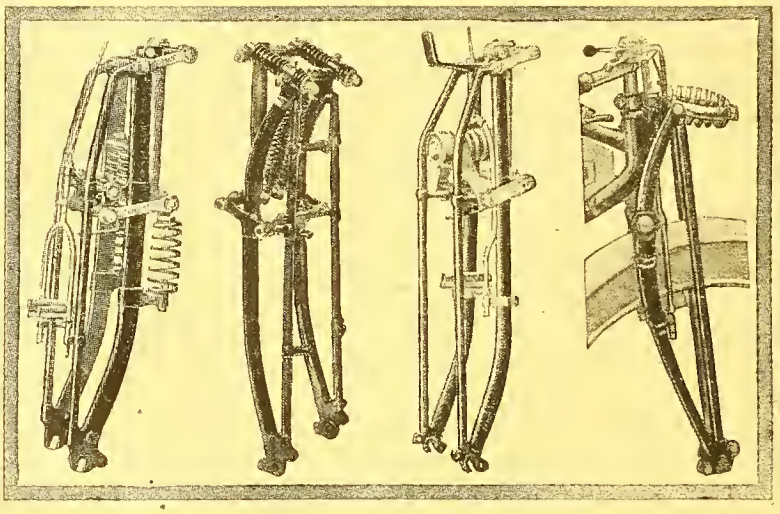
ONE of my qualifications to discourse weekly in this column is that I have done more fast road work than any but a wee handful of veteran riders: and in the doing of it I have "seized up" almost every variety of engine which is made in this country. As a habitual "scrapper" I know perfectly well what to expect. If I "scrap" on a new machine the piston will certainly seize during the day: this is a matter of no great concern, as it is easily freed, and I never yet damaged either cylinder or piston with a seizure. If the piston does not seize, the big end will seize during a fast 200-300 mile run, unless the bushes were very well fitted in the first place or very thoroughly run in before delivery. Consequently I never take out a new engine for a long, high-speed trip, if an old one is available. The above, of course, is commonplace experience enough. When I turn to the job of reporting a big six days trial three alternatives are before me. I must resign myself to missing portions of each day's run, or to seeing only a fraction of the crowd take the big test hills, or to some pretty furious scrapping. I usually adopt the third alternative. If I have time to "ready" my mount it will get through the job. If I take a standard machine, fairly well run in, I am sure to be in some danger of a seizure before the six days are up, even though I use lashings of oil. If I take a single cylinder the piston will probably seize, and if I do not over-lubricate very grossly indeed the big end will probably seize as well. If I take a V twin with phosphor bronze big end bushes, they are almost certain to seize, and if gross over-oiling prevents a seizure they will at least wear quite unhealthily. But if I take an engine with roller bearing big ends I need have no fear of seized big ends, even if I oil quite moderately. I can then oil with an eye on my pistons alone, and how they stick the gruelling will depend partly on the metals of which they and the cylinders are made and partly on minute elements of design. If my engines had been designed according to modern aero principles I should "scrap" joyfully through the fiercest week I could set myself in Scotland without over-oiling, without fear for my big ends and without fear for my pistons.

Front Wheel Springing.

Some Interesting Observations on the Theories of Spring Fork Design.

By A. VAN DER MEE (The Hague).

WE may say with a great degree of accuracy that the shocks from inequalities of the road surface, which must be taken up by springing devices, work in approximately a vertical direction. Some motor cycle spring forks move in a direction diagonally to the rear, and others in a direction quite contrary to this, *i.e.*, diagonally to the front. American manufacturers fit both types of fork to their machines, proving that they are not following any fixed theory.



Some British spring forks—the Druid, Brampton, Saxon, and Triumph.

Obviously both principles are wrong, as, when one direction is the direction in which the shock occurs, the forks moving in the other direction do not spring at all. Both forks are taking up only a part of the shock, and it will be understood the shock must occur about midway between these directions, *i.e.*, about vertically. It may be slightly more to the rear, but never more to the front, and for our purpose we may say with sufficient accuracy that the shock occurs vertically, but, of course, this is not absolutely true.

We must not forget that a springing device is not primarily for riding up steps, nor for a Flanders road with shell holes, where even a Rolls-Royce car is uncomfortable, and for which extremes no springing device ever made can give real comfort.

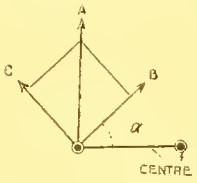


Fig. 1.

Some of our most famous cars have had combined vertical and horizontal springing for the front wheels, but, after exhaustively testing this, the manufacturers have come to the conclusion that the front springing is more comfortable without the auxiliary horizontal suspension. The motor cycle spring fork should imitate the comfort-giving qualities of the springing arrangements on cars.

Any horizontal movement of the wheel gives it an acceleration around the axle, which contributes to tyre wear. First, it is desirable to understand this and to agree with the results of the tests of the best car manufacturers, and not to follow some mysterious theory of the individual, which has never been tested out thoroughly. It must not be forgotten that a motor cycle is running at great speed over all inequalities of the road, which fact makes all theories about the action of a single great shock due to a pot-hole or any other inequality worthless.

The Movement of the Axle.

When this fact is realised one may go one step further and say that the shock must be taken up in the direction in which it occurs, *i.e.*, in a direction about vertical or a trifle more to the rear, as the angle between the perpendicular through the axle and the direction in which the axle moves must be very small compared to the angle between this perpendicular and the centre line of the ball head as now used on motor cycles. Here again we may look to the motor car, where the axle moves about vertically, or to an old Truffault-type of motor cycle fork, and in these two examples the distance between the axle and the centre around which the axle is compelled to move is really so large that we may say that the shock is really taken up in a direction perpendicular to the position in which is situated the line which connects the axle with the centre mentioned above. This vertical movement can never be obtained with a fork with shackles like those of the Indian or Harley machines. Here the distance between the axle and the centre is so small that the shock taken up, when the wheel moves around the centre, is not perpendicular to the line which connects the axle with the centre. We need a centripetal or normal acceleration

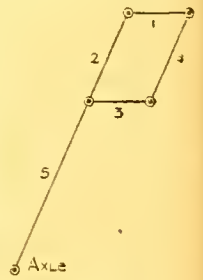
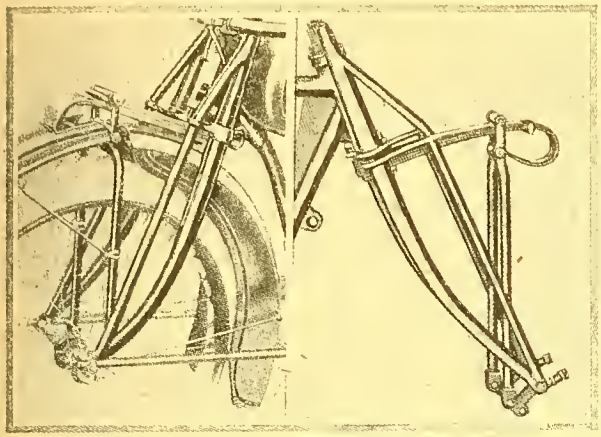


Fig. 2.

Front Wheel Springing.—

to keep the wheel on its path around the centre. The shock gives an acceleration, which is an important factor in this question.

The acceleration taken up is graphically shown in B (fig. 1), so the component C of the shock is not



Types of American forks embodying laminated springs, the Indian and Excelsior

smoothed down. When a machine is traversing a good road at a low speed with a soft tyre, the fork works adequately and the angle α is large, but at a higher speed on a bad road with a hard tyre the angle α becomes smaller, and the component, which the fork is unable to provide, becomes greater. Hence these types of fork can never give real comfort under all conditions. Fig. 2 illustrates the principles of the popular Druid fork, which type I recommend strongly for its very excellent wearing qualities. When the sides 1 and 3, like the sides 2 and 4, are of equal length, the axle moves like that of the Harley, as in this case the quadrilateral 1, 2, 3, 4 is a parallelogram. (The centre of movement of the axle lies at infinity on a line through the axle, which line always remains parallel to the sides 1 and 3.)

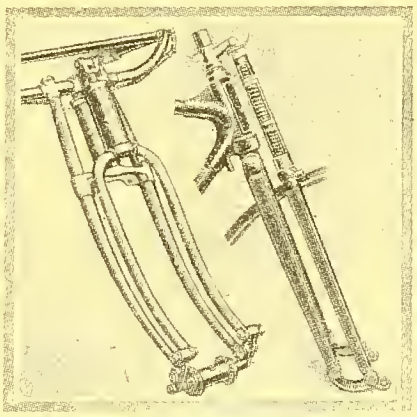
Combining Vertical and Horizontal Springing.

The action of the Brampton type of fork has been explained in the following manner: The vertical component of the shock is taken up by the long vertical springs, and the horizontal component (working at the axle in a direction to the rear) by the horizontal springs at the top. If this explanation were right, the top of the fork would move to the front, tending to compress the two small foremost horizontal springs, but this does not happen. The springs are fitted to serve as recoil springs only, for the two large rearmost horizontal springs actually are taking up a part of the shock. The component B is smoothed down by the large vertical springs; the component C compresses the two large rearmost horizontal springs. This explanation agrees with what we actually see when riding a machine fitted with this type of fork. We may also observe that the combined vertical and horizontal springs together are taking up shocks in a vertical direction, proving that it is necessary to have the axle moving along a vertical path.

Can we attain this with a fork of the Druid type without using rectilinear conductors or guides, which always are subjected to great wear? I maintain that this is possible, that we can make the quadrilateral 1-4 arbitrarily also not a parallelogram. (The side 4 connects the two rearmost joints of the links 1 and 3, and has nothing to do with the centre line of the ball head.) Then the axle moves along a path which mathematically is a curve, the equation of which is of the sixth degree: this means that an arbitrary straight line (for which we choose the vertical) has six points in common with this curve, and now we will choose the proportions between the different lengths of the sides 1, 2, 3, 4, and 5 in such a way that all these points fall close together. This means that this part of the curve is for all practical purposes equal to a straight line. We place our quadrilateral in such a position that this part of the curve is passed by the axle, when the quadrilateral moves under the working of road shocks and springs. Kinematically this problem is not easy to solve. I have, however, found a very easy and simple approximate method by which it is possible to obtain a path for the front wheel, 5½in. long, which, for all practical purposes, may be called a straight line. When the sides 2 and 5 are known, I suppose the side 3 to be of a certain length, *e.g.*, 4in., and then the method enables me to calculate graphically the sides 1 and 4 in such a way that I have the movement of the axle as mentioned above.

A Suggested Solution.

Now when you fit a fork of this construction with Terry spring links, these links will not help to take up the shock vertically as they do when the quadrilateral is a parallelogram, but they would spoil the proper working of the fork.



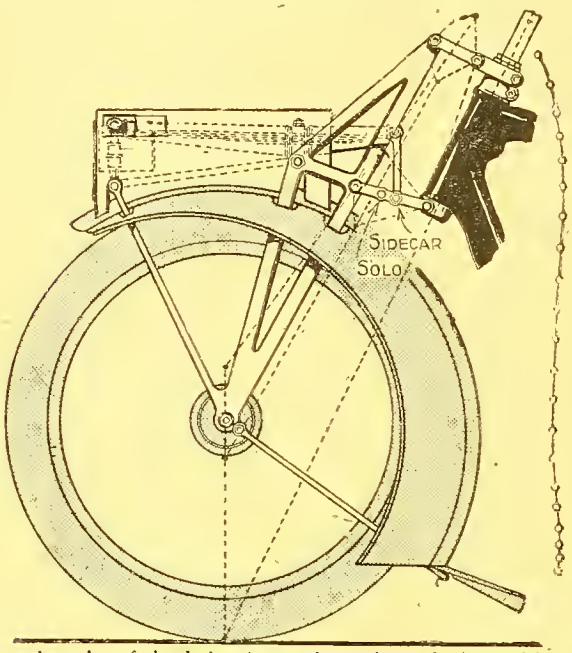
The Henderson and Reading Standard spring forks, which are typical of American practice.

The method of obtaining the straight path for the front axle has a certain connection with the construction of the quadrilateral for the front wheel steering of automobiles, and is very simple. The drawing of my suggested front fork gives an idea of the different proportions. Here the lower links 3 (fig. 2) are also 4in. in length.

Applying these theories to practice we may design a good spring fork. First the size of the wheel should be as large as possible. We must decide upon ample mudguard clearance. We make the side 5 (fig. 2) so long that the ball head does not touch the guard, then choose the sides 2 and 3 and calculate 1 and 4. We draw the quadrangle in such a position that the wheel moves dead vertical, or, if desired, a trifle more to the rear. Then we place the axle about midway on this path, draw the centre line of the head, so that the trail or castor wheel action is zero.

Front Wheel Springing.—

We must choose the type of spring to use. A coil spring between the upper end of the fork and the lower end of the head, taking care to make the ends movable as the upper end of the fork makes a rocking motion. But then the spring lengthens too much, so we mount the lower end, not at the ball head, but

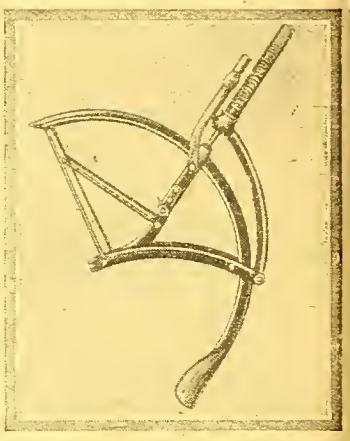


A spring fork designed by the writer of the article, Mr. Van der Mee, with the line of travel of the wheel centre, on a large scale, at the side.

about half-way along the lower link 3. When we move the end of the spring along the link the load on the spring varies. This is of great use, as we may make the end movable along the link so as to provide a means of adjusting the fork for various loads, a desirable feature on a "double-purpose" machine. We call the distance from the foremost end of the link 3 to the point where the spring is fastened to the link (*a*). Then the weight must be directly proportional to the quadrate of (*a*) to get the same (maximum) deflection of the spring by different loads. When we make the lower end of the spring movable along the link we must make the upper end adjustable for length, to keep the quadrilateral in its best position. But we can get far more comfort from a long leaf spring, by preference mounted on the cantilever principle.

This can be done easily as shown by the drawing on this page of the whole fork. The triangular construction of the fork itself makes for great strength. It is not desirable to make the foremost tubes smaller than the chief or rear tubes, preferably they should be of the same size, as the latter are in tension only, while the former are in compression when in use. For sidecar work round section tubes are preferable.

Greater rigidity of the links 1 and 3 can be obtained by making these like the spring shackles of the Ford, *i.e.*, one side link and one spindle as a unit. The spindles must be of a large size, as they have to move through much larger angles than on an ordinary fork. An asbestos lining could serve us as a bearing for the spindles, which then would not require any attention or lubrication. The middle of the spring is pivotally connected to the fork, the foremost part being made longer, as there is more room here for its accommodation.



The Truffault fork. A Continental design mentioned in the article.

A so-called self-lubricating spring, to eliminate annoying squeaks, is to be recommended. In the sketch a leather jacket is suggested. The rear end is connected to the link 3 as described (this connection may take the form of an auxiliary coil spring); the foremost end is adjustably connected to a heavy mudguard stay. This stay is kept in position by a small bar, connected to the triangular frame of the fork, to make the fork independent of the mudguard.

Finally, we place a shield over the spring, making it slightly larger than necessary and utilising the extra space as a number plate.

NO HOLIDAY PETROL EXCEPT FOR MUNITIONERS.

IN response to the request of a great many readers, we recently approached the Petrol Controller on the question of a concession in the use of petrol for the holidays for other than munition workers. We reproduce below our letter to the Petrol Controller and his reply:

The Petrol Controller.

Dear Sir,—Many of our readers have at different times suggested that we should make intercession on their behalf for a small relaxation in the petrol restrictions during holiday time. Up to the present we have hardly felt that we were justified in doing this, but, in view of the recent concession to munition workers, may I put in a plea that all those who have a stock of petrol (legally obtained) should be allowed a permit similar to that granted to the munition workers?

Such permission to ride to the place chosen for the annual holiday would be gratefully received by many motor cyclists who are doing good work for their country, though possibly in other fields than the making of munitions; it would, moreover, relieve the congestion of the railways, which is bound to be felt very much during the next few weeks, and be a source of revenue through the necessary licences.

I trust that you will give your favourable consideration to this suggestion.

Yours faithfully,

THE EDITOR.

PETROL CONTROL DEPARTMENT.
19, Berkeley Street, W.1.
31st July, 1918.

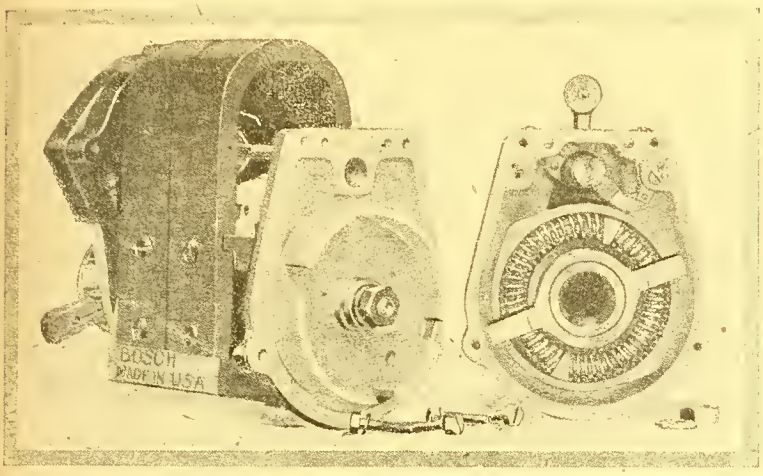
Sir,—I have to acknowledge the receipt of your letter of the 24th July, and, in reply, to say that the Controller has considered your suggestion, but regrets that he cannot see his way to extend the concession made to munition workers so as to include all cyclists who have a stock of petrol (legally obtained) in hand.

G. L. WEBB, Deputy Controller.

AN EASY STARTING DEVICE.

An American Magneto with a So-called Impulse Starter.

IT is not often that the motor cycle engineer can find anything of service to him in the fields of the motor tractor. The tractor and the motor cycle represent the two extremes of motor vehicles. They do not use the same fuel even. Their engines are totally different, as is everything else produced by their makers.



A magneto having an incorporated impulse starter.

Probably at only one point are the same principles involved, *i.e.*, the ignition, and here it may be found that the designer of the motor cycle magneto could borrow a hint from his *confrère* who devotes his attention to providing the ignition apparatus for the heavy slow-moving engines fitted in tractors.

This preamble is inspired by an announcement that the American Bosch concern has introduced a new magneto designed to facilitate the starting of the big engines used in tractors, which, unless dual ignition is installed, are exceedingly difficult to start, especially in cold weather.

This magneto incorporates a flexible coupling between the armature and the driving shaft. When the engine is turned the armature is held stationary by means of a pawl while energy is being stored up by the compression of the springs. After the driving shaft has been turned through a certain angle the pawl is released by a cam, and the energy stored up in the springs imparts to the armature a quick rotary movement, resulting in the production of a hot spark.

When a certain speed is attained by the engine the impulse starter is automatically disengaged, and the power is then transmitted through the springs of the starter to the magneto armature, the starter acting as a flexible coupling.

With a magneto embodying this principle it should be possible for a motor cycle to be started by a slow movement of the leg, and then kick starters could be renamed.

From the initiative shown by British magneto manufacturers and the wonderful development of the industry during the war, one is justified in thinking that the British motor cycle of the future will not be far behind in equipment of this kind if it is found to be of any real advantage

A NOVEL SIDECAR SCREEN.

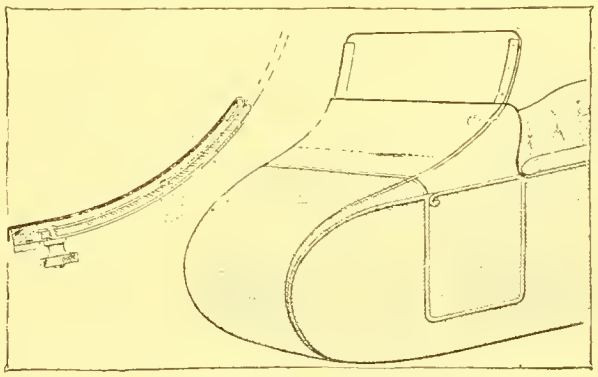
An Improvement in Windscreens patented by the James Co.

THERE is no doubt that if given the choice of a sidecar with or without a windscreen, most ladies would vote in favour of the former. Those who have been driven for any distance in a sidecar along dusty roads know that a screen is more of a necessity than a mere luxury. One feels the wind more in a modern sidecar than does the driver on the saddle, and the passenger is also inconvenienced by dust.

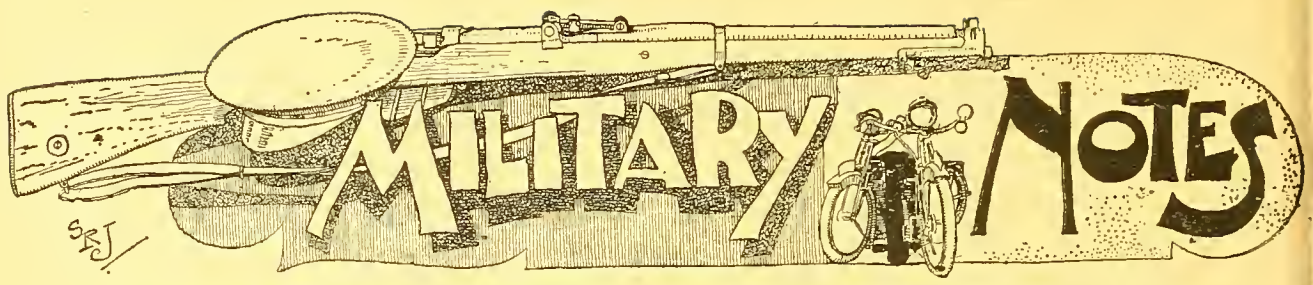
To equip a sidecar with an efficient windscreen is not quite so simple as it would appear, and all kinds of weird inventions have been introduced in order to bring the screen near to the passenger and, at the same time, allow an easy entrance to the sidecar.

The James Cycle Co. has recently patented a design which appears to provide extra comfort for the sidecar passenger at this point. A transparent screen member is mounted upon a hinged cover which encloses the body at that part where the sidecar is located. The screen is of curved form and is mounted in corresponding guides or recesses so that it may be pushed down out of sight when not required for use. Means are provided for locking the screen in position.

It is not necessary for a screen of this type to be very high, as the curved shape gives the air an upward movement, which is continued after it has passed the screen. The draught is therefore carried over the head of the passenger, although the screen may not be as high as the normally shaped screen would have to be for efficient action.



The James patent sidecar windscreen.



Disposal of War-worn Machines after the War. The Question of Control.

PROMOTION.

LT. E. W. WALFORD, R.A.F., an officer whose profession before the war was closely connected with the motor cycle industry, has been promoted to the rank of captain.

A 7,500,000 ARMY.

IT was stated recently by the Premier of New Zealand that the proportions of our 7,500,000 Army are as follow:

England	4,500,000
Scotland	622,500
Wales	277,500
Ireland	172,500
Dominions	900,000
India and Dependencies ...	1,027,500

W.D. MOTOR CYCLES AFTER THE WAR.

DOUGLAS STEWART, writing from France, asks a question of great interest, and puts forward a suggestion concerning the disposal of war motor cycles after the war: "In view of the fact that there will be a great number of motor cycles which the Army will not require *après la guerre*, I should be glad to know whether the Government would give its sanction for soldiers and sailors to have the first choice of purchase. A statement from the Government to this effect would give great satisfaction among the Services. Perhaps you would be good enough to give this note publicity, in order to secure sympathy. Your mail would give some indication of the popularity of the idea."

"JACK" MILLS.

WE recently received a letter from Capt. H. O. Mills, R.A.F., whose garage at Finchley, on the Great North Road, was very popular among London motor cyclists, and who was an exponent of Regal-Green and other machines in competitions.

He writes: "Perhaps you will be surprised to hear from me after all this time, but I can assure you, when any of the old boys meet, we always have a talk over the good old days, and *The Motor Cycle*, which has helped and done so much for us in the good old competition days, always comes up. I was dining at a squadron a few days ago, when we had news of a friend landing, and we therefore sent out to bring in the pilot and observer; and who should it be but Fenn, just as merry as ever. I learnt that he was with the Sopwith Aviation Company in gay Paris; and it was good to see him again and have a chat over old days. Do you know anything of Jack Hilger? He was interned in Germany, and, I believe, sent a message through *The Motor Cycle* about eighteen months ago. I hardly know what is happening in the war or London, as I have been out of touch with daily papers for the last fortnight, but hope to be able to settle down here now for a little while; but, as you can imagine, we get all sorts of jobs, which take us to many weird and wonderful places. Give my best wishes to all the old members of the staff."

"VENUS"—ERRING AS USUAL.

ACT.-CPL. H. GROCOCK, challenging "Venus" on behalf of the "Famous R.E. D.R.'s," says: "'Venus' can ride to any of his R.G.A. battery positions, and he will even then invariably be able to observe the famous R.E. man *passing* his (the R.G.A.) terminus on the way to Infantry Brigade H.Q., and on occasions further forward even. In fact, I have no hesitation in saying that the R.E. man invariably rides further forward than the R.G.A. man.

"This kind of thing is hardly worth discussion—it is so obvious to anyone who has observed the system—but a statement such as that made by 'Venus' is so badly out of truth that correction is very necessary.

"Wishing the 'Blue 'Un' every success."—PELICAN D.R.'s.

HANDLE-BARS & GEAR SHIFTS.

CPL. J. A. STANESBY, R.E., writes: "I notice from time to time in your columns discussions on handle-bars, gear controls, etc. I cannot help thinking that people who condemn wide handle-bars must have struck an unfortunate machine. With forward footrests, as found on the W.D. model Triumph machines, I must admit that the wide bars are uncomfortable, but, given comfortable footrests, situated vertically under the saddle, there is nothing to beat them. The machine is much easier to ride over rough roads, and one has more control over the wide bars. I converted the footrests of my machine to the backward position, and found that the machine was 50% more comfortable.

"As regards gear control, the foot change is much sweeter than the hand, if operated properly. It enables one to slip the clutch and throttle down (or up) in changing—like a car—at the actual moment of changing. I was repairing machines for six months in France, and can honestly say that less wear was visible in the gear boxes changed by foot than by hand—this in machines up to thirty months old. Moreover, it is much safer to keep the hands on the bars on some roads. Of course, some practice is required, but one soon learns to change as sweetly as on a car, and it is, of course, much safer."

A despatch rider and his Douglas at a ferry near Cairo, where a notice figures permanently stating that it is for the use of officers and despatch riders only.

One-lever Carburetters.

A REPLY TO "RAMA."

MY colleague considers that at the present time a one-lever carburetter would be anything but an unmitigated blessing. I am inclined to disagree with him, because he, like many other motor cyclists, has evidently not had the experience with automatic carburetters which would enable him to judge adequately of the advantages they possess.

In the early days of motoring, when all cars were fitted with two-lever carburetters, and the automatic type was in its infancy, there was evolved a new definition, which read, "An automatic carburetter is a carburetter which gives an incorrect mixture at all speeds," and this is practically the case even at the present time.

The automatic carburetter is clearly a compromise, but it is a very good compromise. With a properly adjusted automatic carburetter, although the mixture may be practically always incorrect, it is so nearly right as to render it infinitely superior to the two-lever type; at any rate, on multi-cylinder engines.

What motor cyclists want is a carburetter which will give reasonable economy, reasonable efficiency, and, most important of all, will enable the engine to run slowly. Often in tight corners, in traffic, and on hills, the motor cyclist has to close his throttle suddenly, and, at the same time, set the air lever to prevent the engine from stopping. This operation is a great nuisance, and, in this year of grace, 1918, should be entirely unnecessary.

I venture to think that this contributor has absolutely gone off the line in stating that "so long as you keep your engine at its most efficient speed you will benefit from the fitting of a one-lever carburetter, which admits a mixture calculated to run the engine at that speed and at its highest efficiency." Now, this is the very purpose for which the one-lever carburetter is not intended. It is intended to give an approximately correct mixture at all engine speeds, and it succeeds in doing so pretty well. The two-lever carburetter, on the other hand, admittedly provides the highest efficiency as regards engine speed, and also as regards economy.

Carburation and Speed.

How little "Rama" understands the automatic carburetter is clearly shown by his remark that when the engine slows down it "has to run on a mixture determined previously as the best for the running of that engine at another speed, because the speed varies, but the mixture remains constant." This is absolutely absurd, because when the engine speed is reduced the air is likewise reduced, and a small quantity of rather strong mixture is admitted through the inlet pipe. This gives the excellent slow running and tick over which all properly adjusted automatic carburetters provide.

"To get up a freak hill on an abnormally high gear is the ambition of every motor cyclist I have met," writes "Rama." If this is the case, the sooner the error of this pernicious habit is pointed out to the motor cyclist the better. In all *The Motor Cycle* articles and in the handbooks, time and again it has been stated that the time to change speed is just as the engine begins to labour, thus easing its load and prolonging its life by changing down. As a matter of fact, the automatic carburetter may quite possibly invite the motor cyclist to hang on to top even a little longer than if he were driving one of the ancient and should be out-of-date two-lever type.

The chief reasons, as was pointed out the other day in a leading article, why the automatic carburetter has not become universal are, first, on account of its price, and, secondly, because it has not been understood by motor cyclists who have not fully realised its advantages.

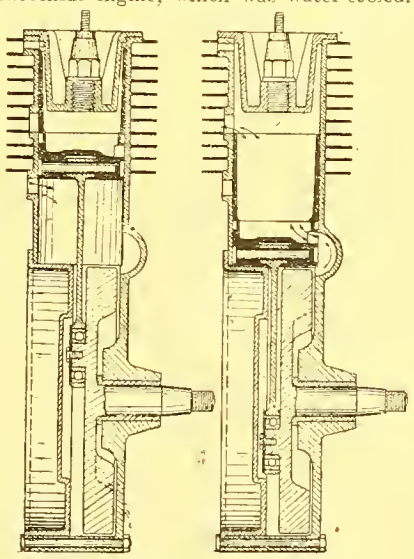
Another extraordinary statement "Rama" makes is, "Let us make sure first that the education (of the motor cyclist) has really sunk in and is not mere camouflage, soon to give way and reveal a reversion; because if that happens the one-lever carburetter will have to go, and then we shall have to start all over again." The point is that the one-lever carburetter for motor cycles has hardly yet come. AILETTE.

An Engine with Inverted Piston.

Unconventionality in Two-stroke Engine Design.

UNDOUBTEDLY one of the most successful two-stroke engines ever produced was the Koechlin, a French four-cylinder design, which, with cylinders 85 × 186 mm. bore and stroke, is said to have developed 110 h.p. This engine had truncated-pistons, which also carried sleeves extending above the piston top. A modification of this design has recently been patented by a Mr. D. J. Hathaway, of Birmingham; but in this design the trunk piston is not used, and something of the same effect is obtained by inverting the conventional piston—that is to say, the skirt of the piston is above instead of below the gudgeon pin.

The drawings render a lengthy description unnecessary. It will be seen that by this design it is possible to have the transfer port at the bottom of the piston and the exhaust at the top, which all two-stroke designers agree is preferable to the more conventional practice of placing them practically on the same level opposite to each other, with a baffle plate on the piston to guide the incoming gas up the cylinder, and the result that the combustion space is never scavenged properly. Mr. Hathaway's design is very promising, but only actual demonstration can prove whether the piston will overheat. It did not overheat in the Koechlin engine, which was water-cooled.



A two-stroke engine designed by Mr. D. J. Hathaway.

The design embodies a single inside flywheel and a dished member in the side of the crank case for reducing the internal capacity. It is also intended to cast the cylinder and one-half the crank case in one piece.

The design is reminiscent of the 1910 patent of Messrs. P. J. S. and T. W. Burt, of Bothwell, N.B. The sleeve piston was also used in the miniature six-cylinder rotary engine made by Mr. G. Funck, which was described in our issue for February 4th, 1915.

We are often asked what is the highest speed ever attained by a motor cycle, and in reply we mention the achievement of J. Booth, who is alleged to have covered one mile on the Gawler Road (Australia) in 35s. (=103 m.p.h.). His mount was an Indian. Mr. Booth, however, must look to his laurels, for a correspondent in France sends us a cutting from the *Sydney Referee* stating that the result of Class 5 in the South Australian M.C.C. Easter meeting was a win by L. Benish (B.S.A.); his time was 2h. 38m. 56⅘s., and the distance five hundred miles! Also Class 1 of this most interesting meeting was for solo machines up to 300 cylinder capacity!

CURRENT COAT

Times to Light Lamps.

SUMMER TIME.

Aug.	8th	9.7	p.m.
,,	10th	9.2	,,
,,	12th	8.59	,,
,,	14th	8.55	,,

Oilfields of Europe.

At the present rate of consumption the known oilfields of Europe will be exhausted in seventeen years.

Life of an American Motor Cycle.

The average life of a motor cycle on active service with the American Army is said to be 2,000 miles.

English as She is Wrote.

Reading an American motor cycling paper recently, we came across the word "petrol" with an asterisk beside it calling attention to a footnote, which reads: "English slang for 'gas.'"

Moon Chart.

We are in receipt of Messrs. C. A. Vandervell and Co.'s monthly moon chart, which is extremely useful at the present time. Copies may be obtained free on application to Messrs. C. A. Vandervell.

The Popularisation of Motoring.

In a recent issue of *The Autocar* a 1917 model G.P. Morgan with dynamo lighting was advertised for £235! And who doubts that English productions will ultimately be marketed at prices to compete with the Ford?

A Camping Trailer.

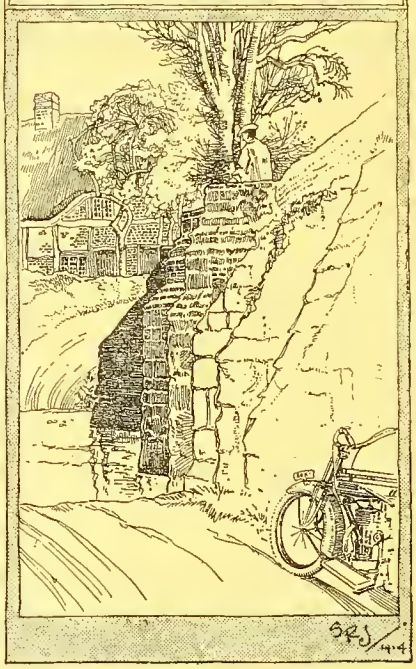
A gentleman of our acquaintance who "trailed a trailer" to carry his gas is now spending his spare time converting the vehicle into a camping unit containing two folding sleeping cots, cooking paraphernalia, etc. He is promising himself a good time during the first "peace" summer.

The Liberty Motor Cycle.

The Liberty motor cycle, that standardised machine which has been adopted for use in the American Army, was designed by a committee of experts (which has now been disbanded as their work is apparently accomplished), of whom the best known to British readers is C. B. Franklin, the well-known Indian rider.

A Well-known Airman Motor Cyclist Killed.

One of our earliest aviators and a keen motor cyclist and racing man has met with a sad end while testing a new aeroplane which crashed near Versailles. This is Capt. C. Gordon Bell, R.A.F., who has flown consistently for seven years. He was in the retreat from Mons, and while flying during the retreat he was shot by a French rifle, one bullet hitting him in the lower part of the back and another sticking up one of the



exhaust valves of his engine. Capt. Bell was eventually invalided out of the Army, and then became a tester for aeroplane manufactures. He was the first airman to fly over Constantinople, from Europe to Asia, and was twenty-nine years of age. As regards his motor cycle career, Capt. Bell was a member of the B.M.C.R.C., and competed on motor cycles and cars on the occasion of several B.A.R.C. meetings. On one occasion he won a race riding W. H. Bashall's Bat.

The late Captain C. Gordon Bell.

Special Features.

FRONT WHEEL SPRINGING.

FLEET OF TEN THOUSAND RAIDERS

TRIALS OF A TRADE RIDER.

Fuel.

What a fortune awaits the man who can discover a new fuel for internal combustion engines!

Motor Scooters.

What has become of the motor scooter produced in America which was to set a new fashion in motoring?

Screens on Sidecars.

If more sidecars were fitted with windscreens motor cycling would be even more popular with the fair sex.

Unanswered Query.

If the correspondent who writes to us from some "Gas Engine and Motor Works" at Forest Hill cares to give us his name and enclose a stamped and addressed envelope, we will endeavour to help him.

Camouflage Possibilities?

In order to deceive enemy craft as to the speed at which a vessel is travelling all sorts of weird devices in the way of camouflage have been used. Does this suggest camouflage for speed merchants after the war?

Bosch to Australia.

A recent Australian Order stated that no magnetos bearing the name of Bosch will be admitted into Australia. The American Bosch Co. is now renaming all those instruments for Australia, and they will go under the name of Liberty magnetos.

Fuel Production.

The Committee appointed by the Minister of Munitions, under the chairmanship of the Marquess of Crewe, has issued its report on the question of home-produced fuels. This report and the post-war policy of the Shell Marketing Co., recently announced in a speech by the chairman, form very interesting reading and comments on the possibilities of the post-war fuel situation.

The Van der Mee Spring Fork.

In this issue we publish a long and interesting article on spring fork design. In a later issue we hope to publish another article by this young Dutch engineer on "Front Wheel Trail." In the meantime, we may inform those interested in Mr. Van der Mee's design, a description of which is included in the article, that the inventor is prepared to sell his patent outright or grant manufacturing licences. Mr. Van der Mee's address is Danckerts-straat 63, The Hague, Holland.

THE MOTOR CYCLE

AVIATION SECTION

Crossing the Atlantic. Radial Engines. Flying over Towns.

Concrete Landing Beach.

A concrete landing beach for naval planes is being constructed in the U.S.A.

—◇□◇—

Avoiding the Train Crush.

Are any readers getting pilot friends to help them to relieve the railway congestion?

—◇□◇—

Landing in a Cornfield.

We hear that a pilot recently made a successful landing in a cornfield (with standing corn). Are there any rival claims or comments?

—◇□◇—

The Fateful "10,000" Again.

Mr. W. H. Workman, the American manager of the Handley Page Co., says the *Aerial Age*, has announced that he has laid before the War Department of the U.S.A., the Aircraft Board, and the Department of Military Aeronautics a plan to build 10,000 bombing machines and fly them over to France by spring of next year.

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Wear and Tear of Machines Crossing the Atlantic.

"The wear and tear of machines by flight," said Mr. Workman, "and the possible loss of machines *en route*, would probably come to a smaller total than by the sinking of freight ships by submarine if they were sent in cargo boats." He is certain that the plan could be carried out with little or no loss of life by aviators flying the machines.

American Aircraft Standards.

The Society of Automotive Engineers has fixed the standards of American aircraft fitments, bolts, etc., so that they will be interchangeable with those of British manufacture.

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Allies' Supremacy.

Mr. Massey, the Premier of New Zealand, speaking at the Working Men's Club at Kew, said that we now hold the supremacy of the air. We have a very much larger air force, our machines are better, faster, and more powerful than the machines of the enemy, and our men are more daring and resourceful.

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Radial Engines.

We have just had a chat with a young fighting pilot, who has been returned to England for repairs. He gives it as his opinion that the combat machine of the future will use a radial engine, on the score of light weight, speed in manœuvring, and comparative invulnerability. A talk with an expert who is keen on his job is always interesting, and we were given some valuable information on the bad habits of Pups, Camels, Dolphins, and other zoological duelling craft, not to be obtained from the spectacled expert. We tried to lead our informant on to talk about bombers and the flying fortresses known as "hush-hush" machines, but his interest evaporated. Needless to say, he had designed a fighter of his own, and a deadly little wasp she looked.

American Air Ministry.

It is proposed to establish an Air Ministry in Washington, modelled on the lines of the British Ministry.

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The U.S. Air Service.

The American Air Service alone is now bigger in numbers of officers and men and branches of organisation than was the whole of the Regular Army when the U.S. entered the war.

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Flying over Towns.

A recent Army Order forbids low flying over towns. In at least one of our "cities of spires" it has long been a favourite stunt with young pilots to fly round a church steeple, as if to count the feathers in the weathercock's tail.

—◇□◇—

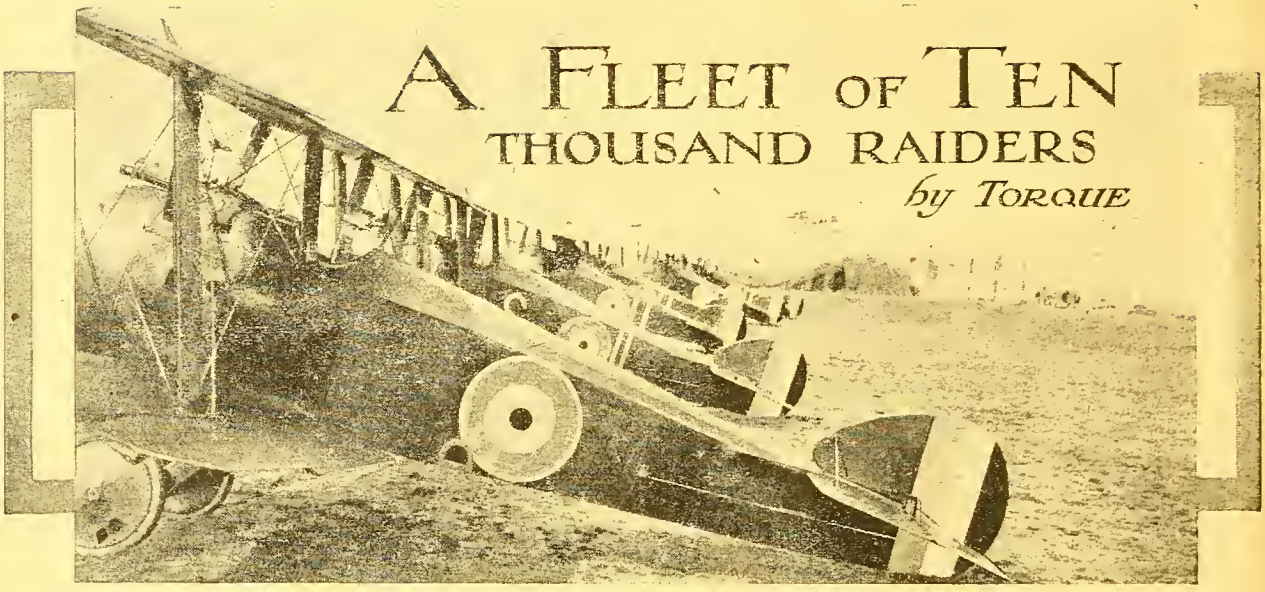
Death of a Well-known Engineer.

We take the following announcement from *The Times*, but regret we cannot throw any light on the real meaning of the last few words:

"The death is reported of M. Maurice Chevreux, a naval engineer well known to *habitués* of the Port Royal quarter.

"The *Débats* states that M. Chevreux laid claim to having drawn the plans of the first Zeppelin which succeeded in navigating the air. Before the war he had accepted an offer to work for several months in Count Zeppelin's workshops, and it was there that he invented the six-cylinder motor."

An early Avro monoplane with a saloon-type nacelle. Is this the first 'bus to be fitted with "Atlantic mail" type of body? Note also the splaying of the landing wheels.



A FLEET OF TEN THOUSAND RAIDERS

by TORQUE

The Problems of a Vast "Independent Force" of Aeroplanes.

SOON after the outbreak of war caught our own Flying Corps with a total strength of a hundred odd (very odd!) machines, scatterbrained amateur strategists began to talk of organising fleets of 10,000 aeroplanes to raid Germany Recent newspaper articles have revived the idea, and the recent Air Ministry announcement that our pilots have "crashed" 4,000 machines in the last year will revive the "hot air" merchants.

Think for a moment what such a programme involves. A decisive offensive by massed aeroplanes upon a given strategic objective could only be carried out by such an "independent force" as we already possess in nucleus; in other words, it would be impossible to suspend the normal activities of fighting scouts, reconnaissance, artillery, observation, and night bombing machines all along the Front. Consequently, the "decisive aerial offensive" would necessarily be a special effort, based on pilots and machines additional to the normal war establishment.

Enormous Reserves Required.

We are not permitted to know how many squadrons compose the normal war establishment of our own R.A.F. or of any Ally: but a technical paper recently stated that at a certain date Jerry had 1,500 machines on the Western Front, and we may take that figure as perhaps very roughly accurate. Jerry can only keep 1,500 machines on the front by dint of having somewhere between 7,000 and 15,000 machines in reserve. At first sight the size of these reserves will seem grossly excessive, but it will nevertheless bear analysis. The wastage of front line pilots is very high, what with wounds, "crashes," sickness, leave, loss of nerve, etc. To maintain 1,500 pilots at the Front one must have from 5,000 to 10,000 pilots perpetually in training. A large supply of slow, heavy, "school 'buses" is essential to such a gigantic training scheme. As hundreds of these school machines will be in the repair shop on any given day, and hundreds more will be smashed beyond repair every year, the supply of elementary training aeroplanes must be colossal. The depots must be kept choked with spare brand new war machines of every type, ready to be forwarded up towards the lines to replace missing and crashed machines. Any published diary of a pilot will record instances of a single pilot flying three different machines on a single day of active service, and of bringing his third mount of the day home at nightfall much the worse for wear. A squadron with an establishment of, say, twenty-four machines can only keep twenty-four engines permanently ready to answer its C.O.'s summons if it has spare engines and spare planes in fair quantities at its disposal. It is thus clear that the flying corps of any belligerent must be backed by a reserve of pilots, engines, and machines equal to between five and ten times the front line establishment.

A "Flying" Force.

Somewhat similar laws obviously apply to any "independent force." The reserve need not, perhaps, be quite so large. If in some future war a generalissimo plans a decisive aerial offensive to be conducted by 10,000 bombing machines massed against the vital nerve centre of his enemy's communications, he may not need a total of 50,000 machines and 50,000 pilots before he can strike. But the force would make more than one raid when the day arrived. Many of the machines would not return from the first journey. Many which did return would be unfit to partake in a second raid for several days. With each successive journey the percentage of "Grade 1" survivors would show an increasing shrinkage. The machines would presumably have two or more engines apiece, and mechanics are always worried by the prospect of getting two or more engines on the same machine "into the pink" at a given hour. Piloting a machine weighing several tons for a 400 miles flight is not a rest cure; the pilots would have to be relieved after each trip.

It is uncommonly easy to talk and write of raiding fleets of 10,000 aeroplanes, as some popular publicists

A Fleet of Ten Thousand Raiders ? —

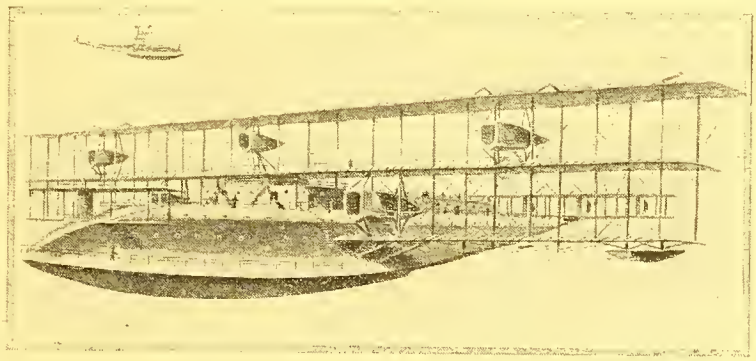
are doing, but it seems extremely unlikely that any such fleet can materialise during the present war. If it be true that Germany's total strength in aircraft on the Western front was no more than 1,500 machines at a given moment in 1917, we cannot credit ourselves with the ability to improvise a surplus striking force of six or seven times the size, nor can we confidently expect America to grapple with such a feat. We are looking to America for an army of millions. Already she has over a million men in France; the second million is promised before Christmas, and other millions will follow them into training. These armies will require aircraft establishments on the normal scale; indeed, they may very probably be more heavily equipped than the standards of 1917 would demand. America is already contributing notably to our aerial superiority, and her contributions will swell enormously as all her improvised factories reach the "production" stage. But it is beyond even her power to furnish a "loose" striking force of 10,000 raiders. Her original programme of 20,000 aeroplanes is equivalent to a front line strength of from 2,000 to 4,000 pilots and machines. The bulk of these would be absorbed in the ordinary "corps" and "army" work. That she has expanded her estimates and may do so again is public knowledge. But leviathan independent forces of the size foretold by certain prating enthusiasts will not materialise until the next war.

The Psychology of a British "Ace."

By X.Y.Z.

I RECOMMEND all our readers to get hold of "Winged Warfare" by the Canadian V.C., Major Bishop. It is far and away the best description of a scout pilot's work which has yet appeared in any language, and is particularly interesting to students who have already perused the writings of Capt. Ball and Baron von Richthofen. In this brief notice there is no space to give a full account of the contents, and it must suffice to say that no book of war flying experiences is half so informing or so well written. Perhaps its main interest is its obviously frank revelation of the development which aerial fighting wrought within the writer's personality.

In the early chapters his standpoint closely resembles that of Capt. Ball. He is reckless to a fault. He hardly recognises danger when he meets it. As a soldier he is eager to strike every possible blow for his side. But he differs from Capt. Ball in that he is less compassionate and has more personal ambition. He plainly feels a personal sympathy with his victims, but he does not repeatedly assert, as the more boyish Capt. Ball did, that he hates killing. At times, when something has occurred to irritate him, he almost "sees red." Moreover, he never forgets his "score," and frankly expresses a very natural desire to register a good bag. He attacks at sight, regardless of danger; and he enjoys each fresh victory.

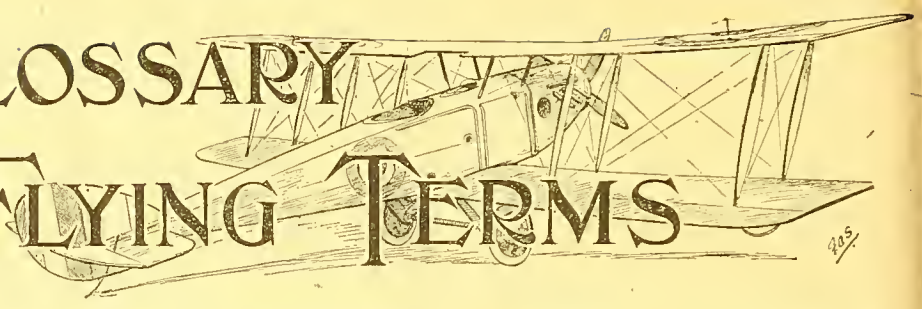


Many are the prophecies concerning the form the Transatlantic aerial liners of the future will take. The reproduction is, of course, a flight of fancy on the part of the artist, but it is quite reasonable to believe that the future is not far distant when 'planes of huge dimensions will be made, of such size that the modern Handley-Page will be puny by comparison.

The later chapters reveal a far more mature fighter. Experience has taught him to realise the gigantic risks which every scout pilot runs. The recklessness goes out of his methods. He becomes a more logical warrior. He weighs risks before he faces them, and restrains himself. He distrusts and overcomes the impulse to attack regardless of circumstances, carefully balancing the risk against the chance of victory. He develops a preference for attacking "fat two-seaters." He studies and improves his tactics. He uses his commonsense and imagination to "put himself in the other fellow's place." He practises gunnery until his marksmanship is deadly. He learns to deduce the steadiness of each adversary's nerves from the nature of his tactics and the steadiness of his shooting, instead of charging about like a bull in a china shop as raw pilots did in 1916 and 1917. By the end of the book he has developed into a cold, deadly fighting man of the most dangerous class.

This book, in conjunction with those of Capt. Ball and Baron von Richthofen, constitutes a trilogy. When Major Bishop was a subaltern, he was a Capt. Ball. When he finished his book he had much closer affinities with Baron von Richthofen. An efficient flying corps needs both the "boy pilot" and the "man pilot"; and these books show how swiftly aerial fighting matures the brain. The embryo pilot is fearless and rash to a fault. He fights with a sheer abandon which makes him intensely formidable. Should he survive the frightful risks he runs in his first month or two, he steadies down into a "man pilot," and becomes still more dangerous, because he now fights with more cunning and restraint. Both types alike fight with confidence. But the confidence of experience is more intelligent and formidable than the fearless dash of inexperienced youth.

A GLOSSARY OF FLYING TERMS



In the interests of those motor cyclists who are not very familiar with the names given to the various parts of an aeroplane and other terms used by the Air Services.

(*Continued from page 548, June 6th.*)

DIVE.

This term is not applied, as might be supposed, to any method of descending indifferently, but is restricted to descents at a speed greater than the normal flying speed. It is plain that such a descent can be made in two separate ways. The indicated speed can be obtained by the help of gravity and the engine combined, or by means of gravity alone.

DRIFT.

The general subject of "drift," or "drag" as a few authorities prefer to call it, has already been dealt with under the heading "Angle of Incidence."

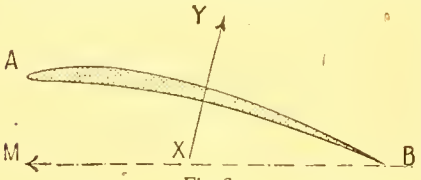


Fig. 3.

When the plane A B is driven through the air the action of driving it produces an equal and opposite reaction. Driving the plane through the air parts the air *forwards* and accelerates it *downwards*. The reaction, being opposed to the action, therefore includes upward and backward components, or, as they are more commonly called, vertical and horizontal components. These are shown in fig. 4, and the backward horizontal component is called "drift," or "drag." It is also known as "resistance," but this is not a wholly accurate term for the following reason. Imagine that an aeroplane mounting an exposed machine gun is flying at 150 m.p.h. There is a vacuum behind the machine gun. This vacuum, to use popular language, makes it easier for the wind pressure to resist the forward passage of the gun through the air, or even sucks the gun backwards, so to speak, and this vacuum produces "drift," though it can hardly be termed resistance. Drift is commonly divided into active and passive drift. Active drift is that produced by the lifting surfaces, such as the planes; passive drift is that produced by non-lifting surfaces, the under-carriage, pilot's cap, engine exhaust manifold, struts, protruding bombracks, etc.

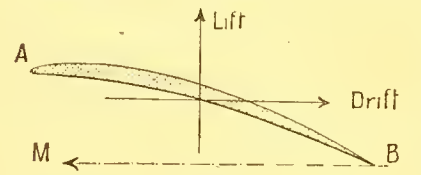


Fig. 4.

ELEVATOR.

The hinged flaps attached to the rear edges of a tail plane for purposes of longitudinal control. They are "rigged" to form a continuation of the tail plane camber towards the rear, so long as the pilot's joystick is in the centre of its fore-and-aft travel. When raised they decrease the lift of the rear of the machine, and its nose rises for a climb. When lowered they increase the lift of the tail, which rises, and forces the nose of the machine down.

EMPENNAGE.

Strictly speaking, the tail plane, or rear stabilising surface. Often loosely applied to the whole tail assembly, including the elevators, rudder, and fin.

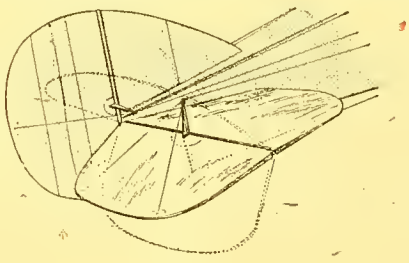


Fig. 5.

FABRIC.

The cloth with which planes are covered. The best unbleached Irish linen is preferable, both because of its strength and of its smooth texture. The latter enables it to be waterproofed and to be coated to a surface provoking a minimum of skin friction without using an excessive weight of dope and varnish.

FACTOR OF SAFETY.

The reserve of strength possessed by any part over and above the stresses it will be called upon to bear. It is usually determined by expressing the breaking point of the part and the maximum stress in similar units (*e.g.* pounds), and dividing the breaking point by the stress. For example, if a wire will stand a strain of 600 lb. without parting, and in a given position on a given aeroplane, this wire will be subjected to a stress of 100 lb., the wire has a "factor of safety" of 6 to 1. This is the margin usually allowed in aeroplane construction.

FAIRING.

Building up materials over a part of an aeroplane in order to reduce its drift, or drag, and to give it a more streamlined

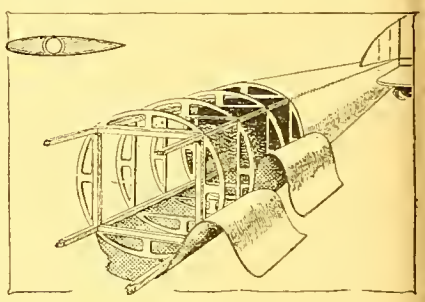


Fig. 6.

form. The materials used vary with the part concerned. Thus the axle of an undercarriage may be faired by bending sheet aluminium to a streamlined form over it. A bracing wire of circular cross section may be faired by threading through a streamlined packing of wood. The fuselage or body of an aeroplane may be faired by building out its rectangular contour into curves with light wooden arched ribs, over which fabric is stretched. Distinguish "fairing" from "cowling." Cowling is usually streamlined, and is therefore in a sense "fairing"; but the term "cowling" is usually reserved for fairing when used as a cover. Thus the cowl over the front of a rotary engine "fairs" or "streamlines" the engine; but its primary purpose is to cover the engine, and so it is not called "fairing."

FAIR LEAD.

A clip through which a wire is run to prevent its fouling something as in turning a corner.

A war correspondent of the *Berliner Tageblatt* (says the *Daily Mail*) reports an interview with an Austrian general, Uzelar, who, speaking of aeroplanes, said: "England, thanks to the sporting training and high average intelligence of her sons, has a much richer supply of human material to draw from than we have. The captured English airman is correct in his behaviour, and never betrays any information."

Single v. Twin in Competitions.

Dean Barry replies to "Ixion's" Comment of July 11th.

"IXION" writes that "no sane man would contest the single's superior record in competitions"; nevertheless, many men who enthuse over twins are apt to forget the single has proved itself superior. Why does "Ixion" "particularly deprecate any comparisons between the records of single and twin-cylinder sidecar combinations"? When the "four" comes along we shall have its performance compared with the twin, and if it fails to compare favourably with, say, flat twins, I think "Ixion" will be the first to mention it. If we are not to compare the competition records of various types, how is the man in the street to judge which is the best? What are the competitions for?.

"Ixion" states that "there are not many riders . . . who could coax a 500 c.c. sidecar through a Six Days' Trial." I agree. But is there a 500 c.c. twin capable of being coaxed through such a trial? I say, No!

The Place of the Single.

Mr. Hugh Gibson is stated to have "literally carried such an outfit (3½ h.p. sidecar) through a trial." I don't believe it. If this be true, then Mr. Gibson's mount was not so good as Mr. Jack Haslam's 3½ h.p. combination in the last English Six Days. He certainly did not carry his machine through the trial. Granted, it takes a very fine driver to take a 3½ h.p. sidecar through such a trial as a Six Days, but the fact that it is capable of being driven in competition with the "big fellows" should not be forgotten. To get a gold in such trials *is* a personal feat standing to the credit of the driver, as "Ixion" states; but why is more credit due to the man than to the machine?

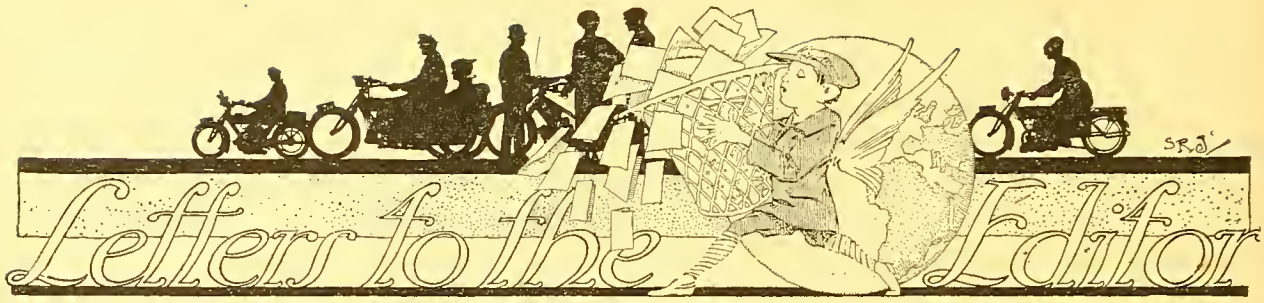
When I wrote my article I had no desire to give an impression that the twin was an inferior mount to the single. I tried merely to make it clear that the single was not deserving of the contempt to which sometimes it is subjected by those who are blinded by enthusiasm for a flat twin. The single has its place in the world of motor mechanics, and likely to retain it for some time to come. I notice "Ixion" does not refer to my remarks concerning the records. The flat twin, which he so often eulogises as being capable of such high revs., certainly should hold some of the 500 c.c. records. It *has* held them, but the single got them back again.

Experience and Experiment on Single and Twin.

One other point. "Ixion" states that there is no reason why the multi-cylinder should not be developed until it is as trustworthy as the single. *Given the same attention from firms of the same class it will reach a similar standard.* I maintain that the twin *has* received the same attention as the single at the hands of experts. There have been more brains devoted to the twin than to the single, as witness the fact that most singles follow one or two successful designs. Why have something like 90% of singles the same cylinder dimensions? How many depart from the 85 × 88 mm. bore-stroke ratio? I know of only four other sizes of 3½ in this country—84 × 90, 85.5 × 85, and 79 × 100 mm. The last-mentioned stands alone, and, incidentally, has swept the records board. Neither can one trace any deviation from the sizes in by-gone years. The fact spells "copy." Then look at the bore-stroke ratios of V and flat twins: scarcely two are alike. That fact spells "thought" on the part of the designers. The twin is no new baby—within a year or so it is as old as the single—and by this time it should not be necessary to refer to its youthfulness.

DEAN BARRY.

A despatch rider with his Douglas on the outskirts of Cairo. Natives are ever ready to loiter on the road, and in this instance with the camels they help to make a picturesque and rather unusual scene.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

THE EARLY "QUADS."

Sir,—"Ixion," in writing of the speed of the early "quads," says they were "extremely slow, twenty miles per hour being their outside limit on ordinary roads." I think "Ixion" must have forgotten these machines or made a miscalculation. The engines were capable of 2,500 revolutions per minute, which, with a 6 to 1 gear and 26in. wheels, is equal to over thirty miles per hour.

I have often timed myself to do twenty-eight to thirty miles per hour on one of these machines for a short distance. They would not maintain that speed for long because they overheated very soon.

The passenger's seat was comfortable, being sprung; the driver's seat or saddle was the reverse, and I have vivid recollections of the sharp concussions received, first from one rear wheel and then the other, when riding on uneven surfaces.

QUAD.

PETROL FOR WORKERS.

Sir,—It occurs to me that an influential journal like *The Motor Cycle* might be able to induce the Petrol Control Committee to relax the restrictions, to enable the overworked people left at home to have a few days upon the open road. Railway travelling is almost out of the question, and is discouraged by the Government. I venture to say that thousands of motor cyclists would take out their licences (with the resultant benefit to the Revenue) for a few days' run.

I see plenty of motor 'buses running to country places, and cars in the West End certainly not on war work. Any suggestion that it would interfere with the petrol supply for our boys over there is nonsense.

I might mention that I am engaged upon engineering work twelve hours a day, and have worked every Sunday except six since last August. The only motoring I have is going through your paper every week. C. HANNAFORD, sen.

[See page 116.—Ed.]

BRITISH AND AMERICAN MACHINES.

Sir,—The "Blue 'Un" of January 24th is just to hand. Will you forgive me if I express disagreement with one or two statements made by "Chinook" in his article on "American and British Machines"?

It is not difficult to guess what machines are intended by the "3½ h.p. British-made flat twin" and the "40° Yank." I have possessed and ridden both. I quite agree that the Thomson-Bennett magneto on the former machine is extremely easy of removal, and that the Splitdorf on the American is a bit of a nuisance to move. But "Chinook" should have stated, in fairness, that the case of the Thomson-Bennett is quite exceptional, and that the removal of the magneto on such British machines as the Triumph and A.J.S. is very little easier than in the case of the American. I have never experimented with African hyenas, but I do know that the lunatic who cannot put his Splitdorf magneto back on to a modern Indian without much trouble, or the possibility of making a mistake, ought to be chased off the road.

And as for the engine of the British HO2, to which "Chinook" refers—well, if he likes to dismantle that, rather than the American, tastes differ. The first time I dismantled that particular engine I was so fed-up that I said I would never tackle the job again. So I pushed it into the leading garage and asked the proprietor to have a try at it. On calling some days later to enquire if the bicycle was ready, he said: "Yes, but it's a disgusting engine to tune up." And it *is!*

Give me the Indian every time. Again, "Chinook" thinks that the only reason men ride the big Americans is because they are high-powered, and light enough for solo use. Wrong again, "Chinook." What Britisher provides the following? Spring frame, big ground clearance, 28in. × 3in. tyres, mechanical oiling, twist-grip control, hand and foot controlled clutch, interlocked with gear-shift, etc., etc. We out in the Colonies know what we want, and "paper experience" is not our sole guide in choosing and retaining a mount.

Once more, if "Chinook" is accustomed to recognise only three positions with the twist-grip control—pilot, half throttle, and full throttle—I can quite understand that he considers the twist-grip an "incentive to bad driving." But that is not the way *we* drive!

And lastly, may one enquire if "Chinook" had not been mixing his drinks when he counted sixty split pins on his American machine?

If "Chinook" considers that he *has* "sufficient knowledge of both (British and American) products to express an accurate view," by all means let us have it—but we are still awaiting it!

We gladly recognise that for all round super-excellent workmanship, the Britisher has it, but in many cases the Britisher, as far as *design* is concerned, is a back number, in my opinion. Let the Britisher modernise his designs, whilst retaining his thoroughly sound workmanship, and he may sweep the world's markets.

Let us have criticism by all means, but when a critic sets out to scold others for making "unfair comparisons," and is himself guilty of what seems to us gross exaggeration and strong bias, we must be pardoned if we do not take his criticisms too seriously.

Again wishing all success to the paper most eagerly looked for when the mail arrives.

Ceylon. (Rev.) A. M. WALMSLEY.

A SUGGESTION.

Sir,—At the present time numerous advertisements are appearing in our newspapers asking the public to subscribe to the war funds by purchasing War Loan.

May I venture to suggest that War Savings Certificates be offered for subscription at 21s. each (£1 repayable in five years), and for each certificate purchased the purchaser will receive one gallon of petrol free of cost. This would only apply as far as surplus stocks would allow.

The Government could appoint a dealer in each of the larger towns to dispose of the petrol. Of course, for each gallon he received under this scheme he would have to dispose of a Certificate. A rubber dating stamp with dealer's name would be used to date the purchase of the Certificate.

I think many workers who at present go to business by train would avail themselves of this privilege. Those who wished to have a joy-ride occasionally would be paying for the privilege, of course, and I have no doubt the Government would rake in some millions of pounds for the conduct of the war.

I do not know the present price of petrol, but I feel assured the Government would make a good profit at no expense to themselves. The Certificate would act as a permit to motorists for seven days from date of issue.

JOHN MASSENIA.

AUTOMATIC CARBURETTERS.

Sir,—I have ridden motor cycles of many makes and periods, and do not consider that any real advance has been made in two-lever carburetter design or construction in the last five years. In peace time I ride an American machine, largely on account of its simple control; and twenty months on W.D. flat twins, controlled by the exhaust lifter, have confirmed my judgment. I have fitted a Binks to my W.D. 'bus. It will now beat any of its brothers in the district, and I can walk beside it. The Binks trouble is this: If run without a hot air line, the jets have to be changed with the weather; if run with a hot air line, it has to be primed to start and raced up in free to get warm. Could not an auxiliary starting jet be fitted, to be shut off when the engine is warm? A Binks for me after the war until I see something better. Everyone out here longs for—

(*a.*) Automatic carburetters.
(*b.*) Better forks and spring frames.
(*c.*) More durable bearings to wheels and steering head.
(*d.*) Circulation oil feed.
(*e.*) 3in. tyres and 28in. wheels with knock-out spindles.

May I add that I do not think any of our W.D. machines are incapable of being improved? F.S.R.

B.E.F., France.

FOUR-CYLINDER MOTOR CYCLE ENGINES.

Sir,—I have read the article by "C.R.E." on "Four Cylinders and Water Cooling" with much interest. He says that it would be interesting to have readers' opinions on the subject as to what they consider the ideal four.

Well, here goes for mine. First of all, I want it to be understood that I have not taken into account the cost, but am just trying to describe a four-cylinder engine of the type I would like to build if I were in a position to do so.

COOLING.—The cylinders would be completely water-cooled.

CYLINDERS would be of steel, a thread would be turned on their outsides, and they would be screwed into a *monobloc* casting of aluminium, which would also form the water jacket.

VALVES.—Two per cylinder, both overhead and as large as possible. They would be a good streamline in shape, and would have hollow stems. The springs would be of large diameter.

CAMSHAFT.—Overhead, cams operating directly on to the valves, with the exception of a small rocker arm between the cam and valve stem to take up the side thrust of the cam. The whole, springs included, would be totally enclosed by an aluminium cover which would be bolted on to the water jacket. The camshaft would be driven by a vertical shaft, which, in turn, would be driven off the front of the crankshaft by bevel gearing. Shaft and gear wheels also to be enclosed.

PISTONS of aluminium alloy, cast with a waist; they would have two grooves—one at the head and one at the skirt. The rings would be of phosphor-bronze at the head, and there would be two rings in the one groove. The ring at the skirt would be a scraper ring only.

CRANKSHAFT would have five main bearings of white metal, and the big ends would also have white metal bearings. The small ends would have phosphor-bronze bushes.

LUBRICATION would be by forced feed to the main bearings, thence through the crankshaft (which would be drilled) to the big ends. The small ends would be lubricated by splash, along with the pistons, and also by an oil lead, leading from the big end to the small end, and, of course, being securely fixed to the connecting rod.

PUMPS.—There would be two oil pumps—one to deliver oil from the tank to the main bearings and a scavenger pump, which would drain the oil from the sump after it had passed through a filter and return it to the tank.

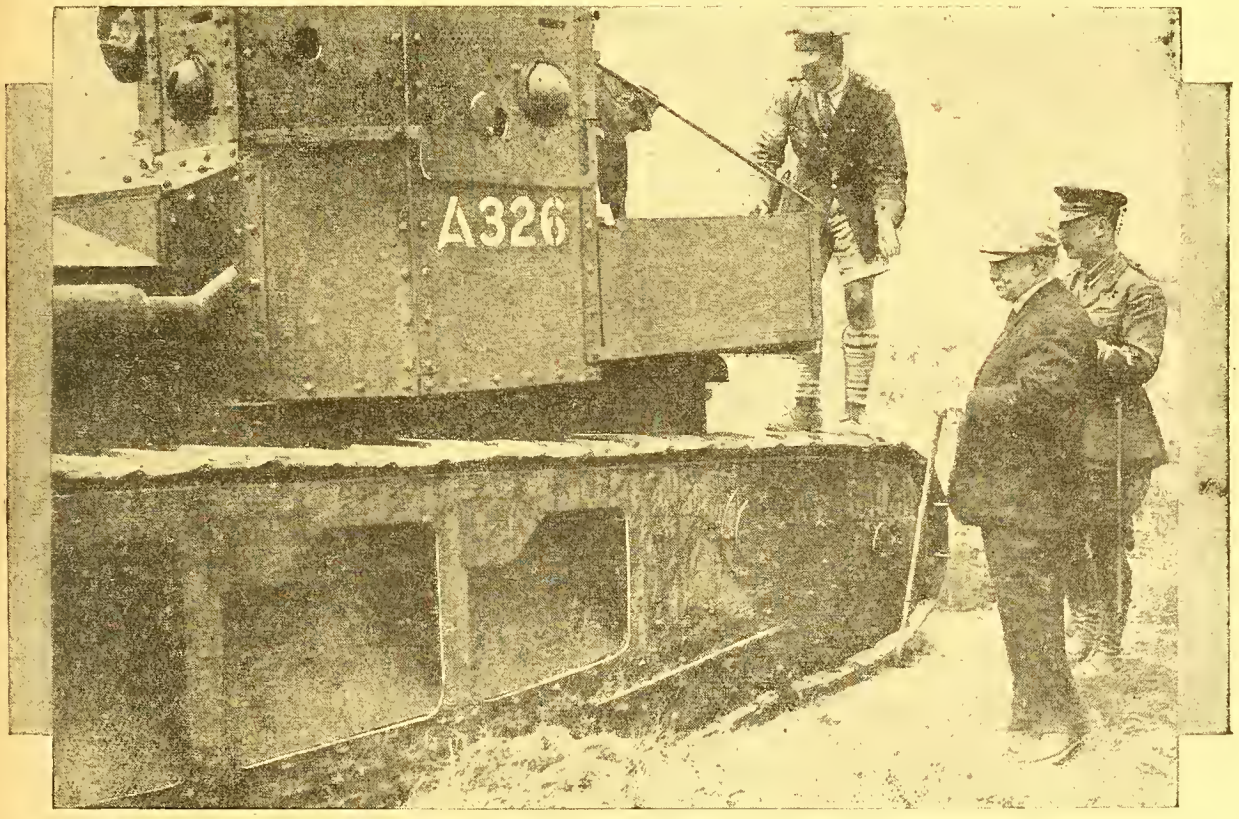
There would be an inside flywheel and clutch and a three-speed gear box cast in one with the crank case, the same as on the latest Hendersons.

Except for the carburetter and magneto, the whole unit would be completely dust and waterproof.

This engine is mostly based on aeroplane engine practice, where low weight and the highest efficiency are aimed at.

Stationed where I am, I have many opportunities of inspecting and handling all the latest types of this class of engine, and I am sure that it would fairly astonish the average motor cycle rider.

The size of the suggested engine would be the same as the Henderson. BASIL G. WOOD.



The Prime Minister of Newfoundland interested in a Whippet Tank on the Western Front.

THE PROPOSED MOTOR TRADE TRAVELLERS' ASSOCIATION.

Sir,—It is more than a strange passing coincidence that the gentlemen who are opposed to the new Motor Trade Travellers' Association generally adopt a *nom de plume* rather than sign their effusions with their own names. Journalists know what value to put on such communications.

The consensus of opinion of those gentlemen who have communicated with me on the subject is diametrically opposed to the proposals made by "Traveller" (?) and others. The great strength of the association will be its independence, although I willingly admit that the sympathies of every *bona-fide* traveller will continue to be with other kindred associations.

It is obvious that there are many questions directly affecting our trade that can be best dealt with by those engaged in it, and one great object that operates in my efforts is the promotion of a greater bond of union between those directly associated with ourselves. JAS. V. ABBOTT.

MOTION STUDY AND THE MOTOR CYCLE.

Sir,—I think the following notes will enable your correspondent, Cpl. C. P. Phillips (issue of July 18th) to understand the method of plotting the locus of the belt fastener. The first step is to find the positions of the fastener *relative to the motor cycle*, corresponding to various positions of the back wheel.

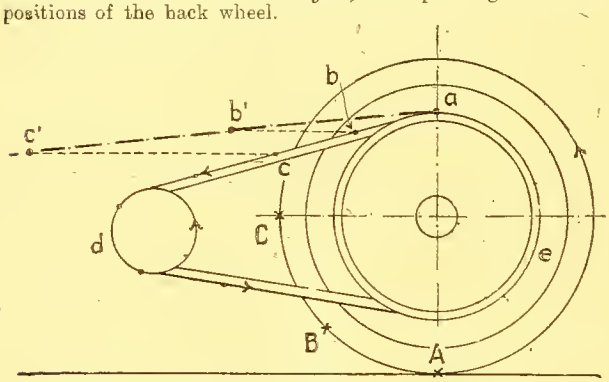


Diagram showing how to plot the locus of belt fastener.

Let *abcde* be the path of the belt relative to the machine, and let us plot points for every one-eighth revolution of the wheel. Then if *ab* is made equal to one-eighth of the circumference of the belt rim, and if the original position of the fastener is at *a*, then *b* will be the required position after one-eighth revolution. Similarly, if $bc = ba$, *c* will be the position after one-quarter revolution, and so on.

We now have to take into account the forward motion of the motor cycle as a whole. During one-eighth of a revolution, the machine will move forward a distance equal to one-eighth of the circumference of the road wheel or tyre. Hence the *true* position of the fastener after one-eighth of a revolution is at b_1, where $bb_1 = AB$ = one-eighth the circumference of the tyre. Similarly, cc_1 is set off equal to one-quarter the circumference of the tyre, and so on. The final curve drawn through points ab_1c_1, etc., then gives the required true path of the belt fastener, such as is shown traced in fig. 3 of my original article. MOHANDIS.

PETROL FOR SOLDIERS ON LEAVE.

Sir,—In your issue of July 25th, "Balmoral" states that he was only granted two gallons of petrol when on leave, and that officers were given six; he did not know why.

I am able to state from experience that the two gallons allowance applies to all *soldiers*, whether officers or men, who run a motor cycle. Six gallons are only granted to car owners, for obvious reasons. E.F.S. (2ND-LT.).

Sir,—As a constant reader of your paper, I have read with great interest the various letters and comments from week to week on the subject of petrol allowance to soldiers on leave and munition workers, and I thought that probably my experience on that subject would be interesting to readers, especially "silver badgers," of whom many, no doubt, have had the same experience as myself.

I joined up in 1915 at the age of eighteen, and after serving Overseas for a considerable time I was severely wounded in the thigh on the Somme in 1916. After spending over a year in hospital I was discharged this year as no longer fit for service. After I arrived home I made application for a petrol permit to enable me to get to and from business, a distance of about three miles, each day, which, owing to my condition, I was unable to walk without great difficulty. After waiting about a month I received a form to fill up, and this I did, and returned, explaining everything. A few weeks after I received a letter saying my application could not be granted. Still munition workers are allowed petrol to take them to and from work and to enable them to go for their holidays; this many of them no doubt are doing whilst they are on strike. I quite agree with the Government's ultimatum regarding their exemptions being withdrawn if they do not return. I guess they will return with their "tails well down."

SILVER BADGER.

INDUCTION PIPE DESIGN.

Sir,—With reference to "Rama's" article dealing with the above subject in *The Motor Cycle* of May 9th, perhaps a few remarks from the practical point of view may open up another aspect of this important subject.

In dealing with the commonly accepted theory anent the advantages of heating the induction system, I beg to differ from the popular idea.

I take it that the purpose of carrying out these heating arrangements is primarily to assist the vaporisation of present day spirit, and maybe to combat the latent heat of evaporation, causing a below zero temperature in the induction pipe whilst warming up.

Now I contend that with the average carburetter there is no advantage gained by supplying a warm mixture to the engine, beyond perhaps facilitating the running for the first mile or so from cold.

Once the engine has warmed up, my experience is that any further heating of either the air supply or the induction pipe actually causes a falling off in power.

In fact, I have obtained a very distinct advantage by providing cooling arrangements on a flat twin induction system on the following lines, viz., fitting an angle pipe, some 4in. in length, between the carburetter and its former flange on the induction pipe and winding copper radiating coils thickly round both pipes. This ensures a practically cold induction system.

Now I account for the power increase by the fact that as soon as an engine becomes hot both the carburetter and its piping receive a large amount of conducted heat, so much so, that many instruments become too hot to touch. Thus, the air supply first and then the mixture become so heated that when actually in the cylinder its mass is reduced; in other words, a *smaller quantity* of explosive mixture reaches the combustion chamber than would be the case if such mixture were comparatively cool (and so of greater density), making naturally for a decrease in power.

As this takes place in the ordinary or unwarmed carburetter, surely any further warming by means of exhaust gases intensifies this rarefying of the mixture, and means a far greater falling off in power!

Therefore I, and many others who have "had some" in this war, plump for the coolest induction system possible, and we know that with an extremely hot engine after many miles of low gear work this makes the necessary difference between climbing and pushing up a hill.

I admit the nature of the riding in the Balkans may have something to do with these results (in many cases the top gear on either a Douglas or Triumph cannot be used for a dozen miles in the hills), but, nevertheless, the effect must show itself in some lesser degree even on a touring mount in Blighty.

It would be interesting to hear what other D.R.'s think of this practice of cooling a Douglas induction system, and whether anyone who has experimented on these lines has enjoyed a complete immunity from the "dry up" so often attributed to overheated plugs and pre-ignition, as I have.

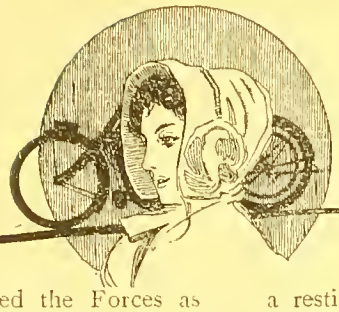
At any rate, I am sure very few military flat twin riders retain the extra heating arrangements as issued.

I speak from three years' Active Service experience, and although at the moment hill tracks have forced a Triumph to replace the little Douglas, an advantage may even be obtained on the single by arranging a cool air supply.

In conclusion, may I express appreciation of the continued excellence of the "Blue 'Un"—the D.R.'s link with home?

May we soon be reading it in an armchair—civilised once more! BALKAN TAP.

THROUGH FEMININE GOGGLES.

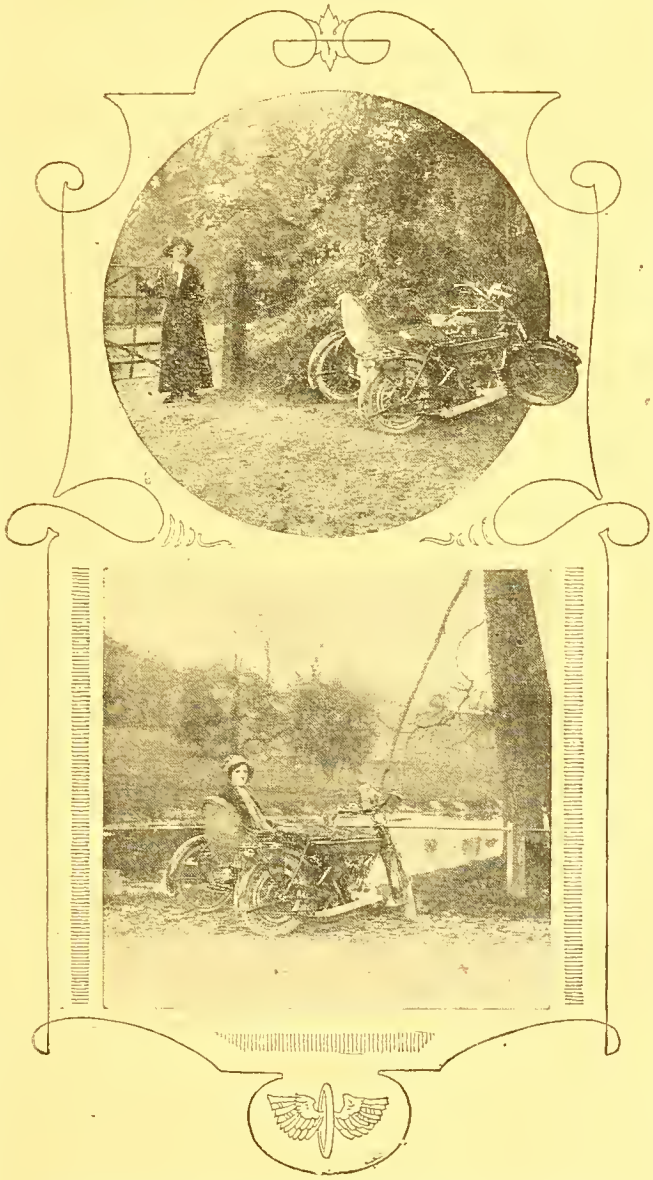


Appreciation of a Royal Enfield and Remarks on the Ideal Lady's Machine.

THOSE women who have joined the Forces as despatch riders and drivers of sidecars are quite content with the standard diamond-framed design, and with the return of normal times we shall not be unnecessarily squeamish when asked to manage temporarily with standard models and so give time to the designers who must eventually and in turn study our special demands. The comparatively few pioneer women motor cyclists whose names were familiar in pre-war days have been lost in the vast numbers who have learned to handle a motor cycle during the war.

The Royal Air Force has its women drivers, and their P. and M. machines, which have been chosen for sterling qualities, are at once powerful and easily handled. The women police favour the solo Enfield. This machine, too, is capable of giving very considerable pleasure, even on long tiring drives, when duty calls. The machine is apt to get hard wear in the hands of the novice, but we all must pass our probationary stage before any degree of excellence is achieved in motoring as in other spheres. Even the masculine mind cannot grasp the essentials to good driving without both theory and practice.

A few days ago I saw a 6 h.p. Enfield combination trying to start off with an additional passenger on the carrier. The driver had evidently still much to learn. The throttle was widely opened, the engine raced, and each time the clutch was let in the front wheel reared like a restive horse. The carrier passenger wore an expression of dire discomfort. I waited, expecting to hear the driving chain snap under the strain, and inwardly fuming in my desire to suggest to the driver a more gentle and gradual manipulation of the clutch handle, when, with a sudden swerve and a dash, the machine got away.



The Enfield outfit which the author of the article used before the war. Such scenes as those depicted bring to mind the old days of petrol plenty, and also prompt the eternal question—When will the days of motoring be renewed?

We all make our mistakes, and the poor machine has to pay for them in undue wear. The Enfield will stand as much ill-treatment as most. I remember some good times with a 6 h.p. outfit. It was made early in 1913—those remote days before one's patriotism forbade a pleasure jaunt. It was used as a kind of family 'bus. When one member had not got it on the "open highway" another had. All the year long it answered up merrily to a twist of the starting handle, and many were the miles it was made to annihilate. Day after day it was hauled forth; given no attention beyond filling up with petrol and oil; left always—shocking admission—with its last coating of mud to be shaken off on the next trip. A bad plan, but our failings are many, and to clean a motor bicycle and sidecar properly requires a good deal of energy.

A tip to obtain ease of starting that may prove useful to those women in charge of difficult engines is to open the compression taps and turn the engine over a few revolutions. The rush of air so caused will dry up any drops of moisture in the cylinders or on the plug points. Then by injecting a few drops of spirit before

Through Feminine Goggles.—

closing the taps again much exhausting effort is saved. This tip is especially useful when a machine has been left standing in a damp garage, and it may also be tried if a suspected cause of the difficult starting is too rich a mixture in the cylinder.

During the cessation of private motor cycling it would be a fine idea if a woman driver of experience would design a lady's mount which would incorporate all the good points of the machines already on the market and discard the faults. There is no machine that embodies all we would like to have, and several that leave much to be desired. Possibly we should not all agree as to what are essentials to comfortable riding, but I feel certain that the handle-bar clutch for one item would secure all our votes.

Summer-time is here once again, and the roads dry and dusty, but we do not talk of 1918 ladies' models. Were such made, prices have risen to such magnitude that few could afford to buy except the moneyed classes: the munition workers. Still some day, perhaps, this topsy-turvy world will readjust itself, and we shall again debate as to the fitments we hope to order at the Olympia Show. Until then we must be content to live on hope and such optimism as we can muster.

MAY WALKER.

MOTOR CYCLES FOR THE DISABLED.

Simple Adaptations of Clutch and Brake Control.

SEVERAL articles have appeared recently on this subject. All are agreed that the motor cycle is easily adapted to the needs of disabled men, but some of the proposed schemes seem too complicated and expensive. With the object of finding a simple method of control I have been studying such up-to-date catalogues as I could get.

Let us consider the case of a man with one leg off above the knee or one arm off above the elbow. It should be explained here that an artificial limb for lower amputations than these can operate any control nearly as well as the real hand or foot. A one-legged man must have the brake pedal put on the same side as his good leg. Most makers seem to favour the near side, but this alteration is very simple if necessary.

The Possible Forms of Control.

There are several alternatives for clutch control: (*a*) Handle-bar control. (*b*) Clutch pedal of the car type alongside brake pedal, so that they can be operated together or independently. (*c*) One pedal operating both clutch and brake, the clutch coming right out before the brake is applied. (*d*) Either (*b*) or (*c*) combined with a long lever control, as on the Indian; this long lever can be easily fitted to clutch pedals of the old Triumph or B.S.A. type. (*e*) Combined clutch and gears, worked by one lever, as in the Royal Enfield and Phelon and Moore.

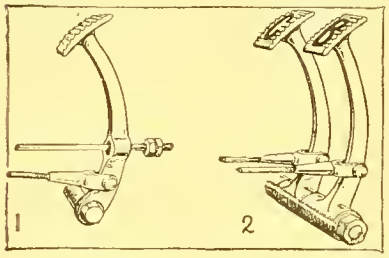


Fig. 1.—Brake and clutch operated by one pedal.

Fig. 2.—Brake and clutch pedals side by side.

The kick starter if on the off side can be operated with either foot. If on the near side (the Douglas is about the only English bicycle thus fitted) it is impracticable for a right-legged man and very difficult for a man with a good left leg. The writer is assuming throughout the use of a sidecar, though solo riding is possible for an active and confident man. But for a legless man handle-starting as on the 6 h.p. Enfield is certainly to be recommended, and is the only form likely to give real satisfaction before self-starters become common.

A man with one arm is more easily suited. He must have his carburetter and ignition levers mounted together on his good arm side, with the exhaust lifter underneath. He can have clutch and brake pedals, one on each side, and kick starter on either side. If he wants a hand-controlled clutch as well, he can have either the long lever type or the handle-bar type. But he must have a foot clutch for gear changing unless he has a pedal gearshift, as in the Scott, or can fit a foot gear-shift, as many D.R.'s do to their Triumphs. In short, the one-armed man can in nearly every case arrange to keep his artificial hand on the bars for steering.

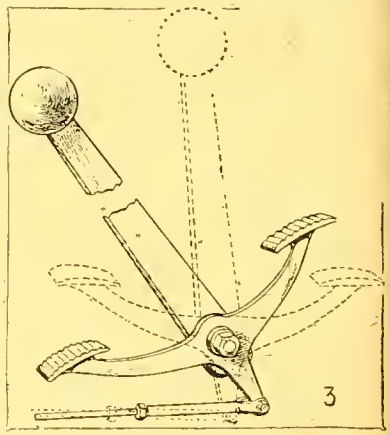


Fig. 3.—B.S.A. type clutch operated by long lever

For Very Bad Cases.

Men who have been so unfortunate as to lose both legs or both arms—the writer is only minus one leg and thinks himself lucky—if they must have a cheap means of getting about, and have the courage to try a sidecar outfit, could probably find a few machines which they could adapt to their needs, handle starting being essential to the one and combined pedal clutch and gearshift to the other. But, of course, both would find a light car infinitely more comfortable and convenient. I have also learnt to drive a car with the greatest of ease since my disablement, never having driven one before; but I would urge on all disabled men not to be discouraged, to try to do as much as possible with their artificial limbs, and, finally, to buy a motor cycle, which has always been to me, and still is, the best, fastest, and most enjoyable means of getting about the country.

F.E.D.H.

TRIALS OF THE TRADE RIDER.

Some Disjointed Recollections of Trade Riders and Pre-war Trials by a Publicity and Competition Manager.

Grindon Hill in the 1914 A.C.U. Six Days Trial—an "unobserved" hill which proved more formidable than some of the test hills.

FOUR times a day I trundle a "bike" across an ancient Midland city. Overhead aeroplanes flit to and fro with the drone of giant bees, or perform some hair-raising stunt that at one time we should have travelled hundreds of miles to see. Through the narrow streets an occasional test car, destined for purposes of war, threads its way through war material lorries and munition workers. In the crowded centre of the town a group of Tommies in hospital garb saunter along, some limping with sticks and crutches, but all smiling happily, that, even amid the bustle of the business of life—and death—they have found a haven of rest after hell on the Western Front.

Sometimes an aeroplane, minus its wings, is seen as the tow of a light lorry. Sometimes we are held up while a convoy of heavy lorries passes through on its way South. At all times of the day black, ugly Fords, with the now familiar M.M. painted on the dash, hurry past, driven by smiling girls in khaki, and at all times of the day we see W.D. models of a famous single-cylinder motor cycle dodging the larger traffic and carrying in their saddles many a man whose face is familiar as a trade rider—men, whose names before the war, were regularly in the list of honours whenever a competition was reported in *The Motor Cycle*.

There are times when I think that these care-free boys are of a race apart. They have little characteristics exclusively their own. Most of them are modest, self-effacing fellows, voluble when they speak of their machine, painfully self-conscious when they have to refer to their share in that machine's achievements. Designated as testers, before the war, the best of them were entered as trade entrants in the various competitions, and they made good, obtained their award and overtime money, and were testing again the following Monday morning. It was all in a week's work. If they got a word of praise from the management they were doubly rewarded because of its rarity. But if they failed it was, "Hard luck, old chap," from their fellow testers, and "You made a mess of it" from those higher up.

"Stars" and their Making."

I am not saying that these remarks apply in every factory. I know, however, that in several works the trade rider, as distinct from the firm's star rider and demonstrator, is not sufficiently appreciated.

The "star" rider is a different proposition altogether. Usually he is a well-connected young man, with a pleasing personality, a knut before he joined the trade. In pretty nearly every case the evolution of the "star" rider is identical. First, an enthusiastic motor cyclist; then a shamateur; then an appointment on the staff of the makers of his favourite machine.

Most of them were nice lads but success, in many cases, made them too overbearingly autocratic. In one connection I always felt sorry for all of them. Motor cycling had been their sole hobby; no other pleasure had entered their lives. When it became their business they lost their hobby and trials no longer were concentrated efforts to win awards for the sake of the sport.

The "star" rider and the testers are not always the best of friends, and the fault is not the latter's. The young knut, with perhaps a season's local successes to back him up, appears at the factory. He is entertained by the managing director. The testers probably have never been inside the director's room. They have been engaged at the works' gate by a charge hand. The one has entered the firm by the front door to find a position awaiting him, the other has clocked himself in and had to work hard to prove his ability.

Nevertheless, the tester gives the glad hand to the newcomer, who is pleased to be taken to the bosom of the fraternity. "Oh, yes," he will say, "he has heard of Mr. A.; he obtained a gold in the so-and-so trial," but he appears rather surprised to see that A. is only a workman, and clocks in at six in the morning or loses a quarter. The new man's time is from nine till six. He goes to lunch at 12 45 A. does not have lunch; he goes to dinner at one.

The new man comes to understand things later on, and when he feels his feet he has a little test shop all to himself.

Trials of the Trade Rider.—

expects half the factory to wait upon him, and gradually changes his attitude toward the testers until he openly treats them as inferiors. There is no class distinction in sport, but when that sport becomes a business it is a different matter.

To a publicity manager, both these classes of riders afford a great deal of valuable material; but, if his appointment also covers the management of the competitions department, it is sometimes difficult to keep everybody in a good humour and at the same time secure results. Personally, I made no effort to control the star rider. It was understood that he entered the principal events, and that he secured publicity whenever he could. If he were persuaded by some enterprising journalist to attempt a publicity-getting stunt it was the result, not the preparations, that interested me; but in the other boys I took a personal interest, and, incidentally, secured just as much publicity of value at about half the cost.

Competition Fodder.

When I was very young at the game I thought numbers counted. I used the men at my command much as the Germans are using their human material. In other words, I entered numbers irrespective of any special ability, and trusted to providence that some of them would secure awards that I could advertise. Anyone who has been through the trials will appreciate that, while luck plays an important part in all events, it is downright foolishness to put up a "dud" rider and expect him to come through. A good rider minus the best of luck is a better proposition than a poor rider plus a good slice of luck.

On the last of these few "mass" attacks, I decided to go myself as a sidecar passenger. I believe it was an early Colmore Cup trial. We had twenty miles to go to the start, and the capers some of those riders cut on the greasy roads in the early hours of that winter's morning were enough to cause a pantomime manager to tear his hair. Out of the dozen riders I had entered, only eight reached the starting place, and two of these were sent home as incompetents. Two more were out of the trial at the first hill, and a third at the second hill, leaving three to complete the course. Net result, one gold medal—the star rider.

There was a stormy meeting in the M.D.'s office on the Monday morning, and I changed my tactics. I picked out a fearless rider for hill-climbs and a quiet, unassuming young tester for the sidecar entries. The star rider would not risk his reputation by coupling a sidecar to a 500 c.c. machine.

This gave me the star man, the London demonstrator, who also was a successful solo rider, an unknown sidecar driver, and a dashing speed man for those hill-climbs the star man considered beneath his dignity to enter. In addition, we had the usual number of shamateurs up and down the country.

Sidecar Tuning.

The speed man was given a machine to tune up, and he tuned it up well, and secured quite a number of awards in local events. For the sidecar man there was a standard machine and a fairly light sidecar, and we went out to various test hills together and experimented with gears and carburetters. We substituted the engine sprocket for one with one tooth less than standard, and found a carburetter that gave us more power on hills; but otherwise the machine was standard in every way. This boy did remarkably well, despite the fact that he did not have the free use of his machine, which is one of the star man's rights. He did so well, in fact, that the management began to expect the impossible, and insisted upon his entry in the Scottish and English trials, in which his chances of success were very remote. As a promoter of publicity, I realised the value of even a try against such odds. There was not a pressman who thought anything of our chances. But a 3½ h.p. sidecar combination had secured an award in the Scottish event, including the dreaded Applecross. We did not get through, however.

The competition rider in embryo. Testers who practically live on motor cycles.

Ideas and Ideals.

After the experience of one-day trials, we knew the weaknesses of our combination. We wanted special tyres for the six days' gruelling on Scottish roads, we wanted a sidecar brake, and we wanted a certain little fitment that would make our rear wheel quickly detachable. We were permitted to have the special tyres on a threat of mutiny and after due enquiries had been made that my man was not in collusion with makers of that particular tyre, and we went through the six days with only one puncture. The other fitments were regarded as fads by the works manager, so we gave in eventually.

The machine was got ready; a standard engine was carefully tuned by the enthusiastic driver. Long journeys were undertaken at a low speed with plenty of oil to run in everything nicely, and at the last minute the works manager decided to give us a new brake for the back wheel. We did not want a new brake. We had had enough of experiments. We wanted an extra brake. At last, a few days before we were to ship our machine to Edinburgh, the star man "busted" his engine.

A Promising Start.

Imagine my man's feelings when it was suggested, as the star man was more important than the sidecar entrant, that his engine should be given to the solo machine. It was with great difficulty that I persuaded him to stay on, and consequently we found ourselves with the choice of one of a hundred brand new, untried engines in the stores. That boy worked night and day fitting engines in the frame, trying them, and taking them out again. The sidecar had been on and off a dozen times before we eventually started for the North by road, in order to run in the engine.

For fifty miles we ran at an easy speed from 15 to 20 m.p.h., and then we speeded up gradually. On a right-hand bend, the sidecar came adrift—the front connection had not been securely bolted up—the single longitudinal member of the chassis dropped to the ground, dug into the road, and we turned over. I rolled out of the sidecar before the 'bus went over. We were carrying a spare cylinder for a northern rider who was entered in the trial, and who had scored his cylinder at the last moment. This, together with spare tubes, belts, personal baggage, cushions, and coats, rolled out with me, the cylinder passing over my head. I described several complete revolutions as I rolled along the grass at the side of the road, for, immediately the sidecar dropped, the driver steered to the side. He told me afterwards that he saw my performance from start to finish before he went over when the back wheel came up. I found him lying in the centre of the road, and the condition of the machine seemed to write "Finis" to our efforts in the Scottish trial.

My companion was severely shaken, and had a cut in his abdomen about three inches long.

As may be imagined, it took some time to sort ourselves out. The machine lay in the road on its side, pointing northwards, the sidecar had turned its head towards home, and our paraphernalia was strewn along the grass edging. When we had doctored up each other, I turned my attention to the machine, while my companion sat on the roadside nursing his head. With the assistance of a yokel, I managed to get the machine on its legs

Trials of the Trade Rider.—

again, and found that the rear wheel was badly out of shape. We kicked it, jumped on it, and hammered it as true as we could, and crawled into the next village with the tyre rubbing the stays. There my companion visited a doctor, while I got into telephonic communication with the people at head office, instructing them to send another back wheel.

The wheel was sent on to a town further north, and we had the damaged wheel patched up to carry us to it. This gave out, however, and we took the railway to the town where the new wheel was awaiting us.

Then we found that the new pattern brake, not being standard, would not operate on the standard wheel, and we eventually started in the Scottish trial with only the front brake. This was out of action early on the second day, and we ran for the rest of the week without brakes.

On the Applecross day, we had been delayed by the breaking of a small bolt which held the rear stays of the frame together. To "fake" this up we had to remove the carrier and back wheel. For the English trials we asked for stronger bolts at this point. A larger bolt was fitted, but the working diameter was not larger; only larger shoulders gave one the impression that it was larger. It was like fitting a few links of a lorry's driving chain in the chain of a bicycle.

And through all these troubles this boy kept his temper. True, he was never joyous; but he was never depressed, and the only times he grumbled were on the Scottish roads, because there was "not half a mile of straight in them."

Trade rider, star rider, shamateur, amateur, I meet all their types to-day, some in khaki, others in blue; and as I return the cheery salutes of those I know, I am reminded that there are others who will never ride in a competition again. They have passed through their last trial and secured their gold. SPES.

FIVE SPEEDS AND REVERSE.

A Novel Gear Box Design embodying Layshafts and a Double Train of Gears in a Circle.

WHEN the countershaft gear was reintroduced on motor cycles it provided two speeds. The next year the three-speed box was almost universal. Then came the four-speed gear box, and experts tell us that nothing less than four speeds will satisfy the motor cyclist of the future, while there are idealists who assert that the infinitely variable mechanical gear is in sight.

The subject of the illustrations on this page is the invention of Mr. S. A. Bagley, of Barrow-in-Furness, and in the form shown by the drawing provides five forward speeds and reverse, but with little alteration could be made to give six, seven, eight, or even more speeds by the addition of two pairs of small gear wheels for each speed.

Fig. 1 shows the general lay-out of the gear box. It will be seen that the driving member (in the form of the sprocket taking the drive from the engine) is connected up to the driven member by means of a more or less conventional clutch, the power being transmitted to the rear wheel by another sprocket, or, as is shown in the drawing, by a pulley.

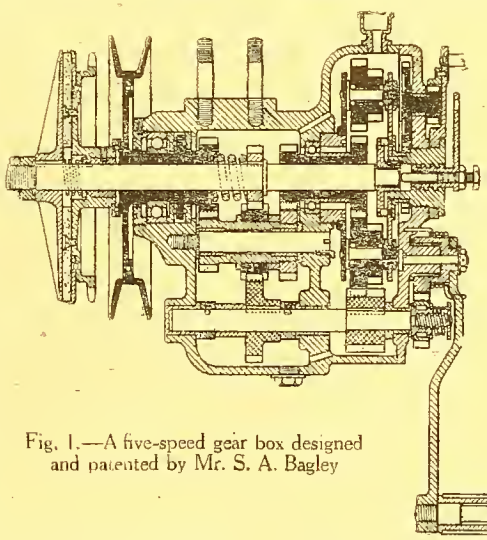


Fig. 1.—A five-speed gear box designed and patented by Mr. S. A. Bagley

This pulley is fixed to a sleeve on the mainshaft. At the inner end of the sleeve within the gear box there is fixed a spur wheel, which meshes with another gear wheel on one end of a layshaft below it. At the other end of this layshaft is another spur wheel meshing with a gear wheel carried on a second sleeve, in which the mainshaft rotates, and which passes through a "wall" in the gear box, and carries on its outer end a spur wheel, which in fig. 2 is the centre wheel of what appears to be a planetary gear.

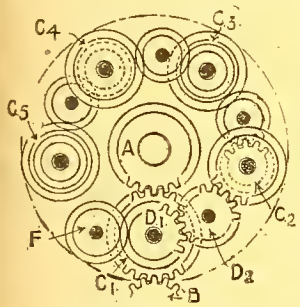


Fig. 2.—Showing the central pinion and train of gear wheels

We are describing the gear backwards, as it were, *i.e.*, from the driven to the driving members, as its somewhat complicated mechanism is easier for the reader to follow this way. If we transfer our attention for a moment to fig. 2, it will be seen that this central pinion meshes with one of the wheels in the circle, which, by the way, form a complete train, but as shown in this drawing (fig. 2) the power is being transmitted through one wheel only, all the other gear wheels revolving idly. The wheel C_1 meshes with a spur wheel B, which is keyed to the lower layshaft, upon which is also fixed a wheel meshing with a gear rotating on the centre of the upper layshaft, which is stationary. This last-mentioned wheel meshes with another gear wheel keyed to the mainshaft, which is driven by the engine through the clutch.

Referring again to fig. 2, it will be seen that if the plate carrying the "satellite" wheels is moved round so that C_2, isstead of wheel C_1, engages the wheel B, then the power will be transmitted from the wheel B to the wheel A, through C_2, D_2, D_1, and C_1. Wheel F provides the reverse.

The five speeds are obtained by transmitting the power through the train of gears at its different points. The first speed is obtained by using the entire train, and when in this gear the power is being transmitted through no fewer than twenty gear wheels.

For second speed nineteen gears are utilised, third speed uses sixteen, fourth thirteen, fifth ten, and reverse twelve.

The Kick-starter Mechanism.

Fig. 3 is an end view of the gear box, showing kick starter and gear change mechanism. The plate carrying the satellite wheels is rotated by gear wheels through a quadrant rack, and operated by a rod, and is locked in position in the usual way; while the spring is within the gear box, the clutch is disengaged by a push rod in a quick thread worm, which moves the mainshaft outwards.

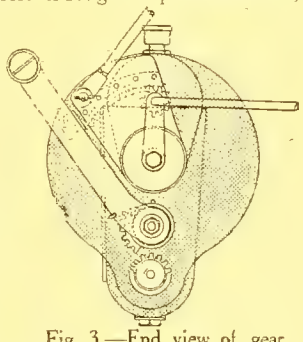
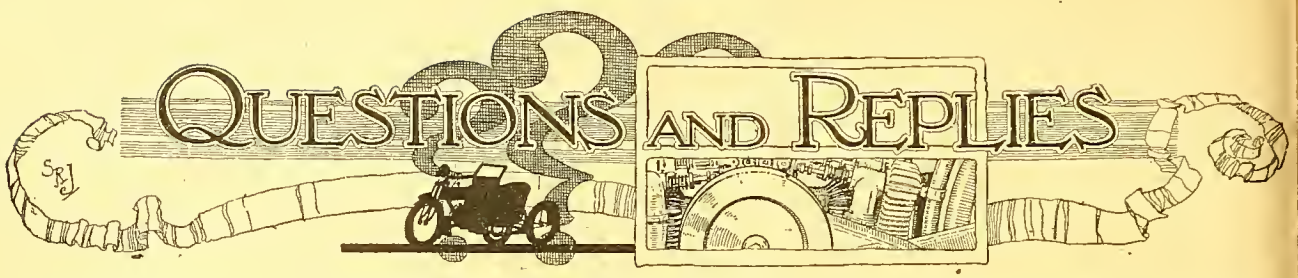


Fig. 3.—End view of gear box, showing kick-starter and gear change mechanism.

This invention is interesting as a design, but we think the employment of so many gear wheels will militate against its favourable consideration by many manufacturers. In the average four-speed gear box there are only six or eight gear wheels. In this design there are over twenty spur pinions, without counting the several gear wheels and sections of gear wheels used in the control.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Address Wanted.

On page 295 in "Motor Cycles and How to Manage Them," eighteenth edition, I find mention of the Hallmond gudgeon pin remover, but cannot find any advertisement of it. I shall be obliged if you will kindly inform me as to where it is procurable.—H.A.K.

The address that you require is Messrs. Hallmond and Co., Saltburn-by-the-Sea.

Incomplete Data.

I have a four-stroke that misses on top gear when the petrol lever is a quarter or half on, but when threequarters or fully on goes very fast and climbs anywhere, but is unable to run reasonably as it used to. A new magneto has been fitted and the plug is clean. Where can I look for the trouble? Is the timing wrong?—A.

Your trouble sounds like carburetter trouble, *i.e.*, faulty mixture, but as you do not say what carburetter you have fitted, nor give any information about the setting of your air lever, it is impossible to answer your query. The trouble, of course, might be due to dirt on the platinum point of the contact breaker, or to a slight fault in the magneto, but on the information you give it is impossible to say.

That Black List!

In September last I had the misfortune to smash a piston a few miles out of Hereford. I pushed the machine—a 6 h.p. Humber water-cooled—back to the city, and left it in a garage for repairs. I could not get the owners there to execute the repair, and having written several letters asking them about it, I called one day in May to fetch the machine away by rail. However, the manager undertook to set to work on it at once, and see what parts were wanted, and get it done if the Humber people would supply the parts. On June 19th I received a letter saying that it would be ready for me on June 22nd if I fetched it, which I did; but I am now anxious to know whether I have been overcharged. I think the bill is a stiff one, but I am enclosing it for your inspection and opinion.—G.W.

We do not consider the amount charged for time unreasonable, and as the price for parts is a factor outside the repairer's control, we do not think the bill as a whole can be considered excessive, although the charge is certainly high.

A Topic for Discussion.

I should be much obliged if you would settle a discussion which recently arose in the mess, and has been made the subject of a bet. An ordinary single-cylinder fixed gear two-stroke, fitted with compression release valve in the combustion head, is coasting down hill with air and throttle shut. My contention, based solely on practical experience, is that by opening the release valve, the braking effect of the engine is increased. My friends say that this is decreased. We all agree to abide by your decision, and I shall be glad to hear what that is, with the reason.—O.M. (Macedonia).

In the case of a two-stroke motor cycle the braking effect is considerably greater if the release valve is open than if the throttle is simply shut and the release valve untouched. The reason is that if the throttle is shut and the release valve unopened, the piston is working in a partial vacuum both above and below, *i.e.*, both in the cylinder and in the crank case. Consequently, it has very little resistance to overcome, and is easily moved. If the release valve be open, however, the vacuum in the crank case is practically unaffected, but on the descending stroke the piston sucks in the air through the small aperture, and on the ascending stroke forces this air out. As the aperture is so small this induction and exhaustion of air requires a considerable amount of effort, and the engine is doing work. If the release valve of the two-stroke cylinder were of considerable size, *i.e.*, about half the area of the piston, the resistance offered to the incoming and out-going air would be considerably reduced, consequently the braking effect of opening the release valve would also be reduced, and it is difficult to say whether it would under these circumstances be greater than that due to the closing of the throttle and leaving the release valve closed. Also another factor would be introduced. There would be a vacuum in the crank case and atmospheric pressure about the piston.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Petrol for House Removal.

Would you kindly tell me if it is possible to get a permit to ride my motor cycle about fifty miles, as I am changing my residence, and it would be very awkward to take it by train? I may say that I have two gallons of petrol.—W.S.G.

As you have petrol by you, you may use it without a special licence or permit in connection with house removal. See page 2, fourth paragraph, of the Motor Spirit (Consolidation) and Gas Restriction Order, 1918 (obtainable from H.M. Stationery Office, Imperial House, Kingsway, London, W.C.2, price 1d.)

Hub Gear Alterations.

(1.) Can the clutch be altered to hand-controlled as well as foot-operated, and where would be the most likely place to buy necessary controls? (2.) Can a handle starter be fitted to the Sturmey-Archer hub? (3.) Have you any catalogue of the Sturmey Archer gear showing the different parts, also a book of the Triumph motor cycle?—W.H.

(1.) The alteration could be carried out, but we do not think you would be able to buy the necessary controls complete. You would have to get the different parts made. (2.) Yes; but a kick starter is more usual. The starter is generally a sprocket mounted on a cross-stay, which is fastened to the back stays of the motor cycle, driving the free-wheel sprocket on the hub by means of a chain. (3.) You should apply to the makers. We do not send out catalogues except to readers abroad.

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PETERBOROUGH TO MANCHESTER.—J.C.

Peterborough, Stamford, Grantham, Newark, Mansfield, Chesterfield, Baslow, Chapel-en-le-Frith, Whaley Bridge, Stockport, Manchester.

NEWCASTLE-ON-TYNE TO HIRWAIN.—D.R.

Newcastle, Durham, Darlington, Northallerton, Boroughbridge, Wetherby, Aberford, Doncaster, Worksop, Mansfield, Alfreton, Derby, Uttoxeter, Stafford, Newport, Shrewsbury, Lydham, Clun, Knighton, Cross Gates, Builth, Brecon, Storey Arms, Hirwain. Approximately 310 miles. This route avoids as much traffic as possible.

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AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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The Luxury Tax.

IT is more than merely unfortunate that, whenever a new form of taxation is introduced, the motorist, and those who look after his interests, always feel driven to raise some sort of protest. It is unfortunate from two points of view. First, it makes it appear that the motorist has strong objections to paying for his pleasure. Secondly, because whenever new taxation schemes are afoot the motorist is always singled out as a victim. Some definite information is now available about the latest form of taxation that is to affect the motorist, viz., the Luxury Tax. It is well known that when the Luxury Tax Committee was considering its recommendations the motoring organisations did their utmost to urge that motor cars and motor cycles should not be regarded as luxuries in war-time, when all self-propelled vehicles are used only in the national interests, and when all purchases of new motor vehicles are only possible because the vehicles are requisite for national service. Our guardians did their best, but they could not overcome the prejudice and suspicion with which the motorist is always regarded, and consequently motor cars and motor cycles are luxuries within the meaning of the incipient Bill.

At the present time it is stated that a motor cycle costing more than £50 will be taxed at the rate of 2d. in the shilling. That is to say, a motor cycle costing £51 list price will actually cost the purchaser £59 10s.

Presumably the tax is not simply a war measure, because if it is it will be practically useless, as few sales of motor vehicles are going on at the present time, and consequently if the tax were intended as a war measure neither we nor anyone else could receive any harm or benefit from it.

The tax will in outline have one of two effects—either the manufacturer will be compelled to turn out a machine of second class quality in order to keep it under the £50 limit, or the circle of motor cyclists will be very much narrowed. Which of these two alternatives is more to be deprecated is merely a matter of opinion.

It has been suggested that the tax should only be applied to the amount by which the cost of the article exceeds the luxury demarcation mark.

If this suggestion materialises the tax on a machine listed at £51 would only have to be paid on £1, and would be 3s. 4d. If this interpretation is adopted, very few people will raise any serious protest against the tax.

We feel, however, that if the tax is to be applied to the total cost of the machine, the luxury limit should be placed at something considerably higher than £50. Consider the man with a car and also a lightweight bicycle, costing less than £50, which he uses for short trips, and on the other hand the family man who requires a sidecar machine in which to take out his family, such a machine being very often just about the limit of his possible expenditure. Which of these two is the luxury machine? Then again, many business men—for instance, commercial travellers—use motor cycles for long journeys: work for which the lightweight is clearly unsuited. Such machines are bound to cost more than £50; are they, therefore, luxury machines?

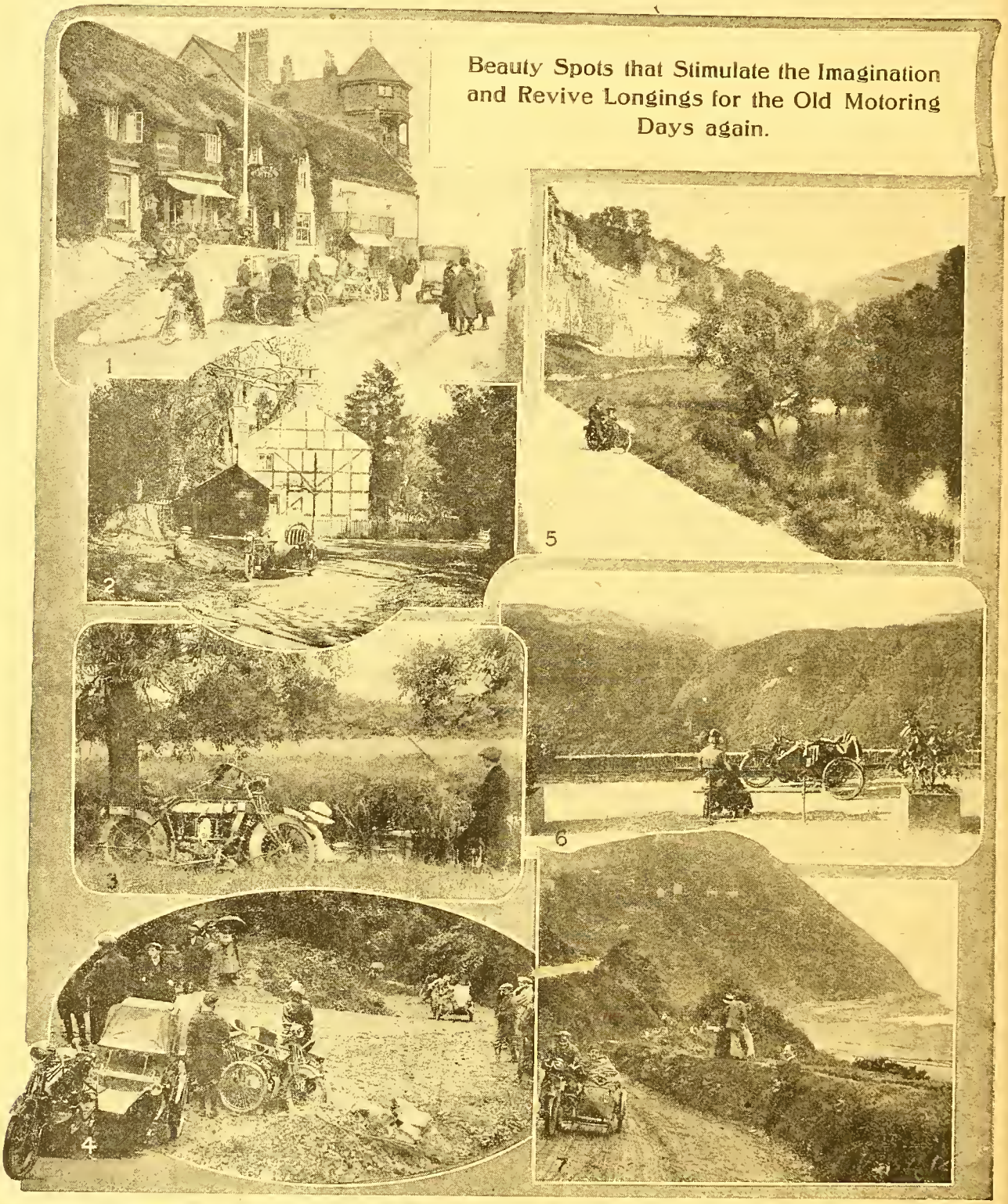
Now it appears to us that a much fairer discrimination between the luxury and non-luxury motor cycle is that between the 3½ h.p. sidecar machine costing £60 and another machine nominally of the same type costing something like £80. This difference in price may be seen in pre-war catalogues.

Bearing all these facts in mind, we suggest that £70 is a much fairer limit as the price separating the luxury machine from the non-luxury machine than is £50, and especially does this argument apply if the tax is to be demanded on the whole purchase price of a machine that exceeds the limit, because it really means that only the solo rider of a lightweight machine, *i.e.*, the man other than a family man, will escape the tax.

An index to the advertisements in this issue will be found on the page facing the back cover

Summer Scenes in Many Counties.

Beauty Spots that Stimulate the Imagination and Revive Longings for the Old Motoring Days again.



(1) An inn familiar to many motor cyclists in Devonshire—the Rising Sun, Lynmouth. (2) A picturesque timbered cottage in Hertford. (3) In the piping days of peace: fishing in the shade of the drooping willow, Warwickshire. (4) On the famous Porlock Hill, portions of which are 1 in 3. (5) In Lytton Dale, Derbyshire. (6) At the Devil's Bridge, near Aberystwyth, North Wales (7) A much photographed scene, but one that never palls—Lynton from Countisbury Hill, Devon.

Occasional Comments

by "Ixion"

Live and Learn.

TWO or three of us learnt quite a lot recently in the course of one morning's reconnaissance round the local motor sheds. We caught a sportsman trying to panel the body of a home-made cycle car with lino—an idea which has possibilities. Then we swaggered up to an obviously ignorant farmer, who appealed to us to start the engine of his tractor. We wallowed in his trap for half an hour, and half-killed ourselves to no purpose, despite all the cunning tricks we knew. Then an old hayseed with string tied round his trousers lumbered up, and heated the sparking plugs with a painter's blow lamp, and, hey, presto! the engine was off.

Cycle Cars by Compulsion.

THERE is said to be a flutter in the dovecotes of the light car manufacturers. As readers are aware, light cars were produced on a very small scale in pre-war days, and the shops which earned a reputation for such chassis enjoyed comparatively small outputs. After the war the number of wealthy people who can afford to buy costly cars may not be large. Where economy is not compulsory, it will often be practised voluntarily, for many motorists have learnt what topping little light cars were being turned out in 1913-14. Consequently it is freely rumoured that some of the biggest car concerns in the country are going to concentrate on 10 h.p. models after the war. The smaller firms can hardly hope to compete with the leviathans in one and the same line of business; some of them are afraid that, like Othello, their occupation is gone. It is hinted that several of them intend to take one step downward, and try their 'prentice hands at producing cycle cars.

About Transmission.

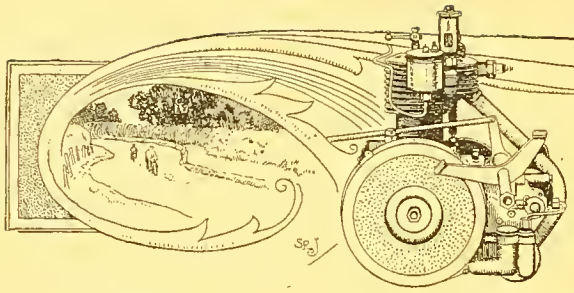
I AM one of those ancient dug-outs who still hanker after the belt of our childhood's days. Unrepentant and unashamed, I still hold that the evil odour in which belts find themselves is ascribable to several factors for which belts, as belts, are not to blame. The sidecar did the belt a lot of harm. Small engine pulleys and cheap belts of too narrow a section, considering the engine power, further spotted its reputation. As I am not a sidecar merchant, I can lay my hand on my heart, and say that I want no better drive than a pukka inch belt on a 3½ h.p. with an engine pulley giving me about a 4 to 1 gear on top. Then the amidships gear box came in, and the direct belt drive naturally became impossible: I am still at a loss to know why the chain-cum-belt drive has lost prestige, for I have never suffered from really bad slip with it, even when mountaineering on a lightweight in torrential downpours. I can only suppose that the sidecar gentry, who, like the Nationalists in Parliament, exercise an influence out of all proportion to their numbers, have had a rotten time with it. Anyhow, the all-chain drive was "it" in 1914; and, to my thinking, a jolly indifferent "it," too. Very few makers have turned out a chain drive which is really smooth, even when new. If you leave the drive naked, the silence and precision of your chains soon disappear: I know readers will write and claim to have done 10,000 miles on one set of chains: but it is nevertheless true that no genuinely fastidious owner would brag about such a feat, which simply advertises the fact that all his instincts are unrefined, and his perceptions coarse. On the other hand, if you encase your chain, you lumber the machine up with a variety of contraptions which are always hideous, usually tinny, rattlesome, unspeakably awkward to dismount, and unspeakably more awkward to replace: in the few cases where they are quiet, efficient, and manageable, they are extremely expensive, and—as already stated—abominably ugly.

The Shaft Drive.

STRAWS show which way the wind blows, and I notice with a half-malicious pleasure that the more advanced designers are now speaking depreciatingly of the all-chain drive, just as the pioneer brains were slighting the belt a few years ago. Some of the more conservative firms have just screwed themselves up to the point of adopting the all-chain transmission, and others of a more go-ahead type are already busy trying to get rid of it in favour of the shaft. It really looks as if all the varieties of drive were going to abide with us permanently, each in the class of machine for which it is most suited. Thus, the hot-stuff single-cylinder may cling to the direct belt: the 350 c.c. flat twin may retain the chain-cum-belt: the single-cylinder sidecar slogger and the big V twins will presumably keep the all-chain: and the bigger flat twins and the four-cylinders may transfer their allegiance to the shaft drive.

Class Preferences.

IT is simply nonsense, in face of a recorded majority verdict in favour of the 3½ h.p., 2¾ h.p., and baby two-stroke on British roads, to pretend, as some controversialists do, that the fine Indian, Harley-Davidson, and other 7-9 h.p. twins are the only goods. Like our own heavy, high-powered machines, they appeal to a certain class of rider, and the choice between them and roughly similar British mounts is mainly a matter of individual taste. But contentment with lower speeds and an unswerving stipulation for lower weight are such fundamental principles with thousands of buyers that the big twin would not appeal to these riders if it were cheaper and better than rival types, which it is not. One man's meat is another man's poison, even in the motor cycling world, and there are plenty of keen riders who are left stone cold by the 60 m.p.h. solo, 45 m.p.h. with a sidecar, spring frame, and dynamo lighting and starting with which a big twin seeks to decoy them away from their light four-stroke or lighter two-stroke.



SOME UNCONVENTIONAL VALVE DESIGNS.

Inventions aimed at Improving Engine Efficiency by Novel Valve Arrangements.

DESPITE the proved overall efficiency of the conventional poppet valve, engine designers continue to maintain a steady flow of inventions planned to eliminate it. The number of different designs of sleeve valve is so great that to treat with these types adequately requires more space than can be spared in this short article on "unconventional valve designs," and as sleeve valves are not altogether unconventional it is proposed to omit them altogether.

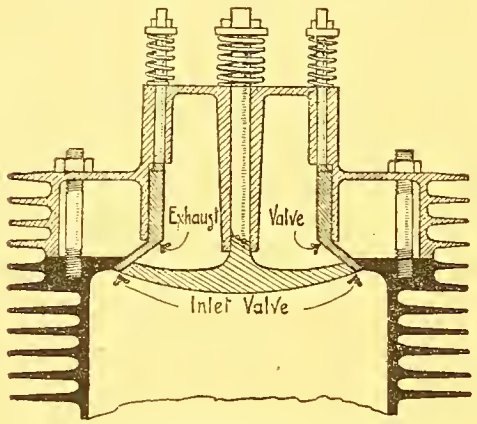


Fig. 1.—The Ward concentric valve arrangement. Note the seating of the inlet valve in the tubular exhaust valve.

While the first invention to be dealt with—the Ward concentric valves—embodies the principles of the poppet valve, the arrangement is so different that certainly it comes within the scope of the title of this article.

As will be seen from the accompanying illustration, fig. 1, the Ward patent is a valve within a valve, the exhaust valve being tubular in shape, terminating in rods to which are attached the closing springs. This exhaust valve also forms the seating for the inlet valve, which is of the usual form and carried on a central stem.

This valve is not altogether unique, but may be regarded as a representative of a type, there being many similar arrangements which have appeared in *The Motor Cycle* during the past few years. So far, however, the type has made little or no real progress commercially, which may or may not be due to makers' well-known dislike for the unconventional.

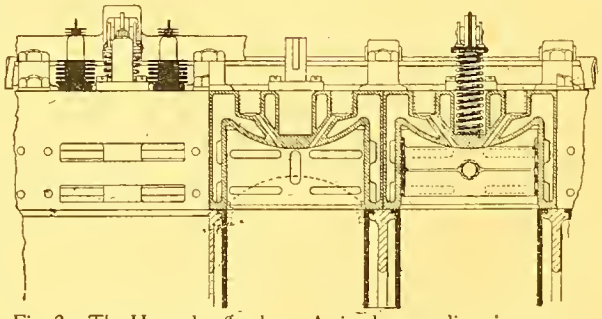


Fig. 2.—The Howard cuff valve. A simple expanding ring covers and uncovers annular inlet and exhaust ports.

The Howard Cuff Valve.

The Howard cuff valve (fig. 2) is more than a paper invention: it is embodied in a large six-cylinder car engine which of late has created a great deal of attention in the automobile world. It consists, briefly, of a single cuff working in the cylinder head, in which are arranged annular inlet and exhaust ports. Both these rows of ports are covered and opened by the reciprocation of the cuff, which, while of generous dimensions, is very light. This cuff, or ring, is just wide enough to cover both sets of ports with sufficient overlap to prevent leakage. It is split and tongued at one point of its circumference so as to make it elastic and to enable the compression and explosion pressures to force it tighter against the wall of the cylinder head.

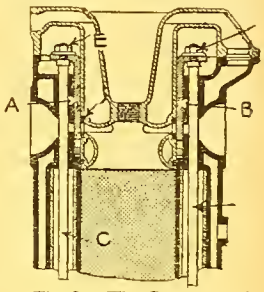


Fig. 3.—The Cooper particircular slide valves. Note that the sleeves A and B are separate slides and not, as would appear, a complete cuff.

The valve is operated by a rocker working directly upon an overhead camshaft. A lever presses the other end of the rocker against a light bridge piece, which in turn is connected by valve rods to trunnion pins screwed through two bosses formed with the valve at diametrically opposite points, the trunnion pins passing through slots in the cylinder head wall to the valve rods.

Our sister publication, *The Autocar*, dealt at length with this invention in the issue for December 1st, 1917.

Fig. 3 is the subject of a 1914 patent of a Mr. S. Cooper. It apparently is an attempt to embody some of the principles of the slide valve of a steam engine. Two particircular slides are located in the combustion chamber and work in recesses, and are not subjected to endwise pressure in the power stroke. Around the

Some Unconventional Valve Designs.—

detachable head of the cylinder is a broad packing ring, which is prevented from rotating and is slotted opposite the gas ports. In reading the diagram it must be remembered that the slides A and B are not a single sleeve, as might appear at first sight, but are separate slides worked by independent rods. It is not clear how these slides would be lubricated, and probably this problem would be somewhat difficult to solve.

The Youngblood Magnetic Valve.

A valve designed to be operated by an electric current in lieu of cams and push rods is a most fascinating invention. Mr. J. C. Youngblood, of Atwood, U.S.A., the inventor, aimed to reduce cost of construction, minimise mechanical complication, and secure quiet running. The design embodies a cylindrical valve chamber lying horizontally on the cylinder head, into which ports open—two from the combustion chamber and two more, one from the inlet manifold and one from the exhaust manifold—above and opposite the cylinder ports.

Sliding in this chamber is a piston valve, the centre of which is cut away so that, by a suitable sliding of the valve, direct communication can be established between one of the cylinder ports and the inlet manifold and between the other cylinder port and the exhaust manifold. With the valve in the central position both ports are closed. The piston valve is operated by solenoids, while springs are used to keep it in a central position normally. The current is distributed as required by a timing device very like the old low-tension magneto timing system. Mr. Youngblood's valve design is shown in fig. 4.

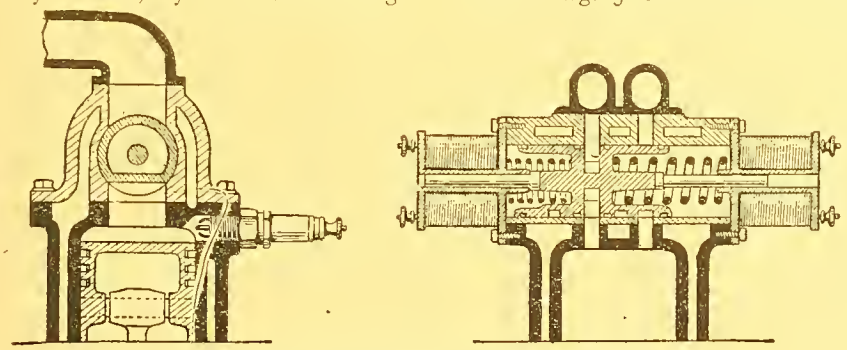


Fig. 4.—The Youngblood magnetically-operated piston valve

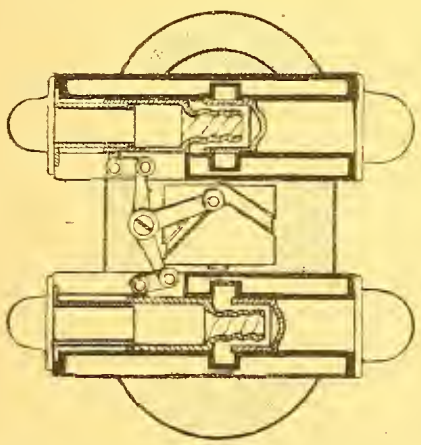


Fig. 5.—Sectional plan view of the Treier valve. One roller cam only is necessary to operate the valves of a two-cylinder engine.

The Treier Piston Valve.

Another interesting horizontal piston valve is shown in figs. 5 and 6. This is the Treier valve invented by another American engineer, who appears to have adequately provided for cooling the valve chamber.

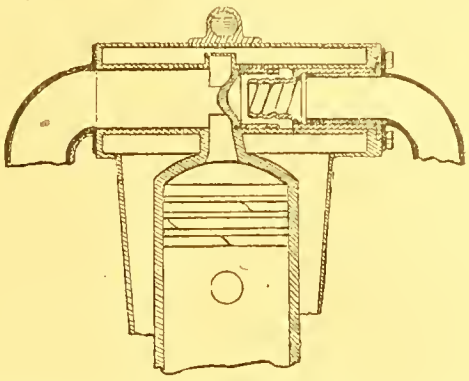


Fig. 6.—Sectional elevation of the Treier piston valve. The mixture enters through the nozzle of the spiral within the piston valve, thence through the ports in the wall of the valve.

From fig. 5 it will be noted that there is only one valve for exhaust and intake, as in the Youngblood design. The mixture enters through a spiral nozzle, cools the end of the piston valve which has been exposed to the exhaust gases, and then enters the combustion space through slots, as shown in the upper part of the cylinder in fig. 6.

The operating gear consists of a double bell crank lever, the end of which runs in a groove in a roller taking the place of the usual cam. The groove is so shaped that when one cylinder is exhausting the other will be on the compression stroke, thus one roller operates the valves of two cylinders. It is not clear how the opening of the intake immediately after the closing of the exhaust is secured, but probably the rapid movement of the valve is sufficient.

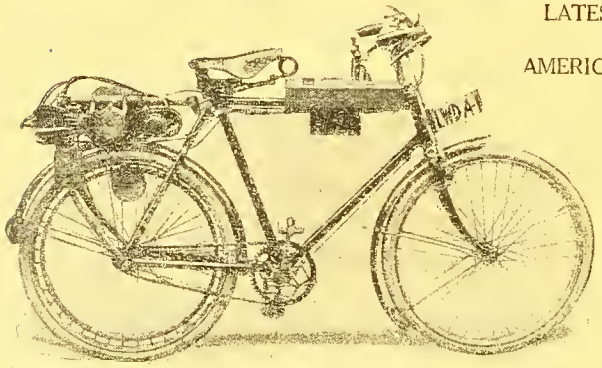
The foregoing are only a few of the many unconventional valve designs, but they serve to show that many engineers appear to be dissatisfied with the conventional poppet valve, although the latter type is used exclusively on aircraft engines in the flying services of the Great Powers.

The J.E.S. auxiliary engine and the Auto-wheel were becoming very popular in this country when war broke out, and it would surprise us if there is not quite an extensive demand for such machines for converting the ordinary pedal cycle into a motor vehicle when things become more normal. In America the idea is carried out in a number of different ways; apart from the Auto-wheel, there are several auxiliary engine sets for fitting within the frame.

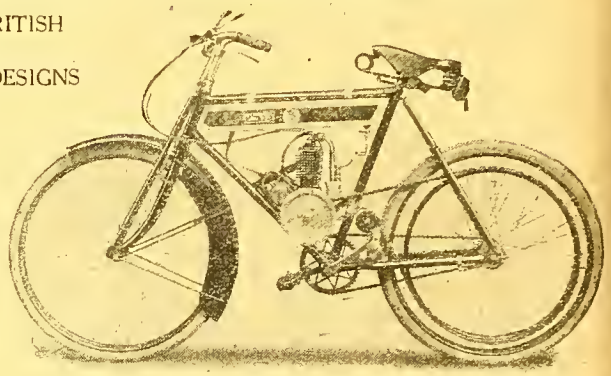
THE MOTORISED BICYCLE.

Some Notes on Auxiliary Attachments and the Ultra Lightweight Motor Cycle.

LATEST BRITISH AND AMERICAN DESIGNS

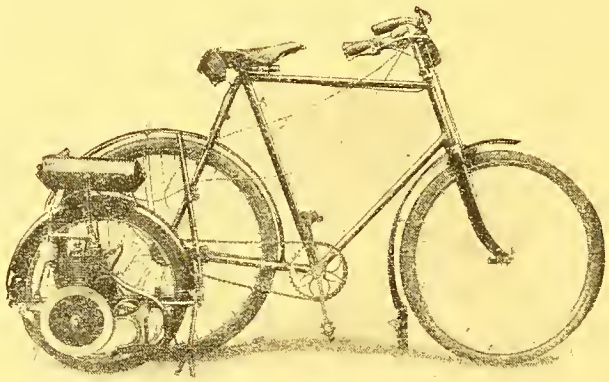


The latest British design in auxiliary motor attachments. The Zephyr unit fits on the rear carrier and drives by friction wheel.



The Imp, a British design of particularly neat appearance. The engine is a two-stroke.

THE original conception of the motor cycle was a bicycle with a small engine to assist the rider. Fifteen years ago *The Motor Cycle* referred to the 3½ h.p. machine as a high-powered model, and to-day there are potential buyers of motor-driven machines who tell us that they aspire only to own a machine with just sufficient power to make pedalling easier. At the back of their minds they compare "horse-power" with that of the quadruped, and think that a small pony will supply all, and more than all, the power they require. It is a mystery to them that motor cyclists speak of 3½ h.p. as being a shade on the small side to propel two persons when they know that a sturdy pony will haul a governess cart with four people.



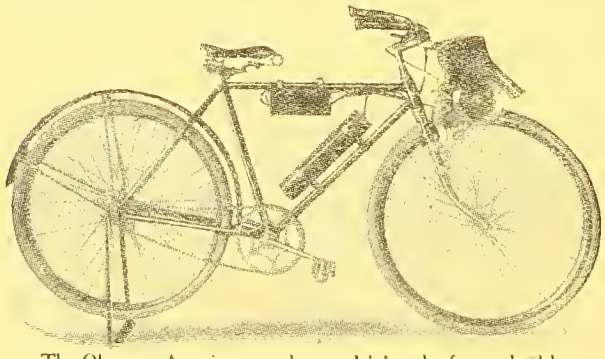
The Auto-wheel, which, in America, is attached to bicycles, tricycles, carriers, four-wheel runabouts, scooters, etc.

These potential riders of petrol-driven cycles want that which the early designers set themselves to provide, *i.e.*, a motor-assisted cycle, or, as our American cousins term it, a motorised bicycle. Undoubtedly there will be a big demand for such a machine, provided it is proved efficient and reliable.

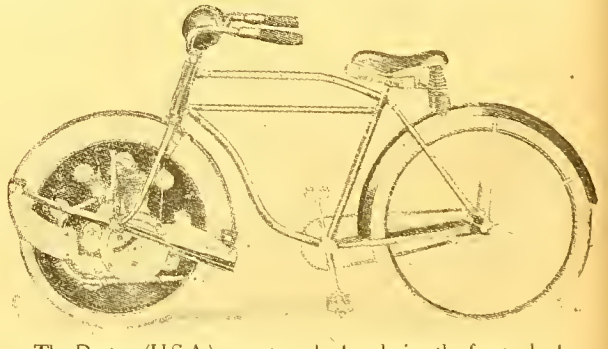
This class of machine may be divided into three groups: (1) the Auto-wheel type, which is self-contained; (2) the substitute wheel type, which may be described as an enlarged Auto-wheel, and is used to take the place of either the front or the rear wheel of a pedal cycle; and (3) those having an auxiliary motor for fitting to the frame or the carrier.

The Auto-wheel has been a great success in America, where it is manufactured in large quantities under licence from Mr. Wall, the English inventor. But for the war, probably we should have seen greater developments in this country. However, it is safe to say that the several similar units now produced in the States were inspired by the popularity of the Auto-wheel

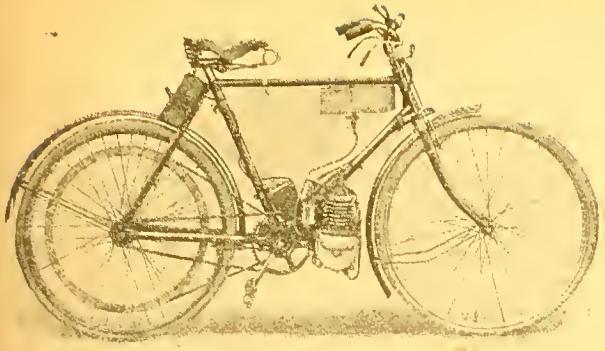
The additional wheel has the great advantage of being entirely self-contained—it is, in reality, a small power provider harnessed to a pedal cycle, just as a pony is harnessed to a cart or a tug boat to a barge. Its disadvantage lies in the fact that a single-track machine is actually converted into one having two tracks, but, as these tracks are very close together,



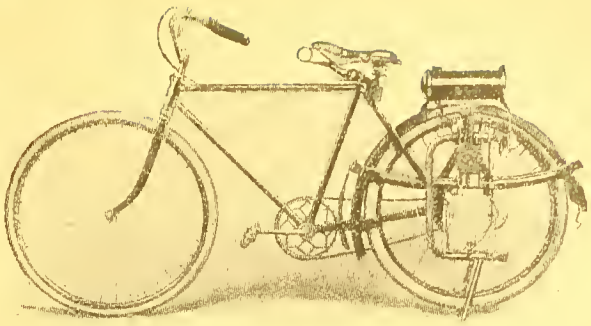
The Okay, an American attachment driving the front wheel by frictional contact



The Dayton (U.S.A.), a motor wheel replacing the front wheel of a bicycle.



A miniature auxiliary engine, embodying a rotary sleeve valve.

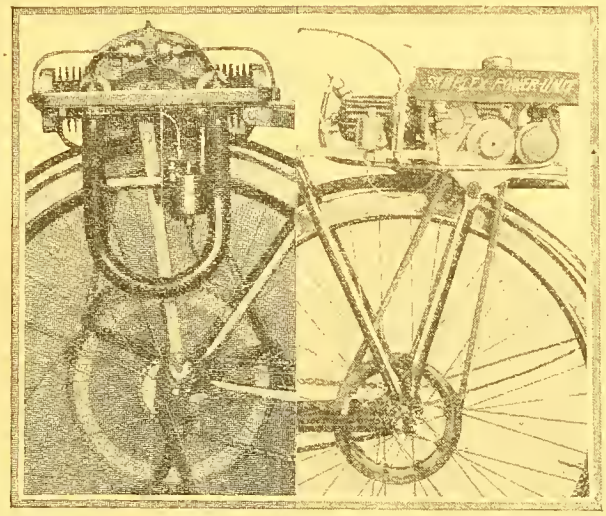


The American Merkel motor wheel, taking the place of the standard rear wheel of an ordinary bicycle.

the disadvantage is not so real as it would be if the Auto-wheel were further away.

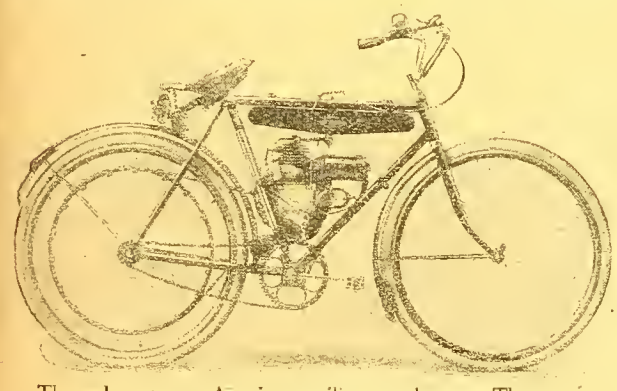
Many years ago I fitted to a pedal cycle a miniature trailer carrying a Werner engine and supported by a castor wheel. The trailer was held by two extension arms of the rear stays of the cycle, and drove the rear wheel of the cycle by a chain, the castor wheel being used to support the weight only. An attachment of this kind comes into the same class as the Auto-wheel, as, like the latter, the frame of the cycle does not carry more weight than it is designed to carry.

The Dayton and Merkel motor wheels, produced in the United States, are on somewhat similar lines to the old Singer motor bicycle, in which a self-contained motor wheel took the place of one of the wheels of the cycle. In the case of the Dayton wheel, the designers decided that it is better to place the motor in the front wheel, as the rear wheel has to support most of the weight of the rider. The makers of the Merkel take the opposite view, and, if given the choice of the two, no doubt British motor cyclists and cyclists would vote in favour of the rear wheel—an opinion with which anyone who has ridden a bicycle with a heavily-loaded carrier in front of the steering head will agree. However, this is not quite a parallel case, as the faults made apparent in riding a carrier bicycle are due more to the height of the weight than actual avoirdupois. In a motor wheel like the Dayton the weight is kept as low as possible, and some of it is actually below the wheel centre. Nevertheless one's imagination runs riot when one thinks of greasy roads and steering by the wheel that is under power.



(Left) The latest American attachment, embodying a flat twin two-stroke engine. (Right) A British auxiliary unit on the rear carrier—the Simplex—employing a two-stroke engine and belt drive.

The first thing that strikes the cyclist when considering a machine of this description is the apparent unequal distribution of weight. The engine is on the side of the wheel, and those who have carried a weight on a rear carrier know that steering is affected if the weight is unequally distributed. In the Merkel machine, however, the flywheel is on the opposite side of the cycle wheel, and, even if it is not of the same weight as the engine, a little calculating of leverages will bring about an approximately equal distribution of the weight's effect upon steering. Personally, I think an auxiliary attachment

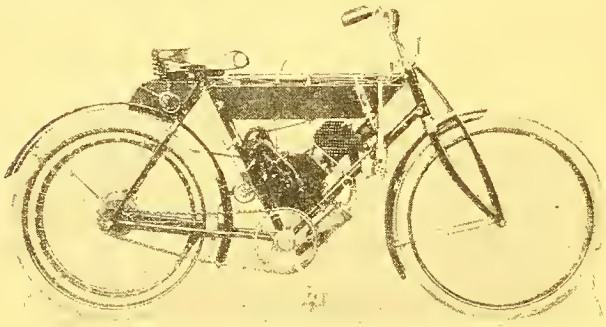


The cycle motor, an American auxiliary attachment. The power unit is a small two-stroke engine.

The Motosacoche engine set of 1907, designed as a complete unit to fit in the diamond frame of a bicycle.

The Motorised Bicycle.—

on the lines of the Zephyr will make a strong appeal. In this case, however, the tubes and wheels of the bicycle are called upon to carry an additional load, but, if the bicycle has a specification similar to that of a carrier cycle, the frame will stand up to the strain, as it cannot be so much as some of the loads with



The N.S.U. lightweight, a 1907 motorised bicycle of neat design.

which the butcher's boy overloads his machine when he carries the carcase of a sheep on the front and a *confrère* on the "step."

The J.E.S. auxiliary attachment is the next step, but, although an ordinary bicycle provides the main elements of the machine, it straightaway becomes a motor cycle, and one can quite understand that the owner of such a machine would next invest in a motor cycle proper.

The Dividing Line.

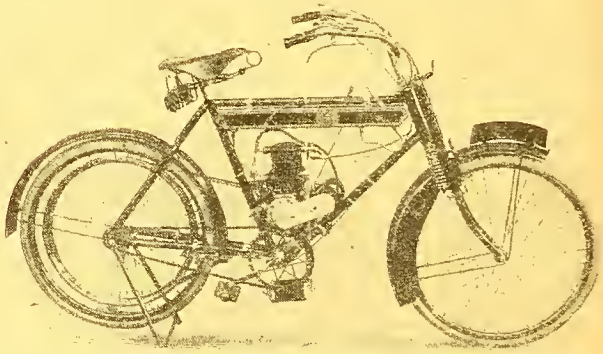
In the majority of cases the motorised bicycle will never be much more than a stepping stone between all-pedal power and all-petrol power. Most riders, once having experienced the pleasures of a self-propelled machine, will be content no longer to assist the engine up hills, neither will ten to fifteen miles an hour—the present idea of their maximum requirements—satisfy them. Above these speeds a stronger frame, larger tyres, and a spring fork are necessary, and the only class of machine to meet these requirements is a motor cycle of the orthodox type. Hence the next step is the small lightweight with an engine of 170 to 200 c.c. capacity and two-speed gear box.

As will be seen from the illustrations, the motorised bicycle has received the attention of manufacturers in all motor manufacturing countries. The Motosacoche is one of the best known of the earlier designs, and probably was a little before its time. The idea of making the attachment entirely self-contained, and the provision made for protecting the rider from oil and grease, are distinctly good. The N.S.U. machine was neat, but the engine was somewhat on the large side for use in an ordinary bicycle frame.

Engine Type and Position.

It will be observed that designers have tried all positions for the engine. The American Okay follows closely the lines of the very early Werner in the position of the power unit from the front wheel, while the design providing the little engine, attached to the underside of the front down tube, will commend itself to those who wish to provide also for the fair sex. Taken generally, however, I think the rear carrier position will be found to be the best for all-round purposes, as here it is well out of the way of mud thrown up by the front wheel, and can be adapted equally well to a lady's or gentleman's machine.

As regards the type of engine, the two-stroke appears to offer the great advantages of cheapness and simplicity combined with low weight for power. The latest American design has a flat twin two-stroke engine, which should cost no more to make than a single-cylinder four-stroke.



A motorised bicycle with a 57 × 63 mm. Dayton two-stroke engine. A machine fitted with this engine did remarkably well in the last A.C.U. six days trials

To the expert motor cyclist perhaps the motorised bicycle appears more or less of a toy; but, provided it is well-designed and made, and sold at a reasonable price, there is no reason why it should not be a great recruiting medium for more serious motor cycling. Apart from this, however, undoubtedly it would fill a niche of its own as a utility machine, and cater for a class to whom the heavier machines would not appeal.

VEDETTE.

PETROL CONSUMPTION OF U.S. MOTOR CYCLES.

EARLY this year petrol consumption trials were carried out by local clubs all over the United States. The averages for the three classes are as follows: Heavyweight solo, 94.73 m.p.g.; heavyweight sidecar, 76.44 m.p.g.; lightweights, 98.2 m.p.g. In the first-mentioned class the winners in thirty-three contests ranged from 61.2 to 180 m.p.g. (180 m.p.g. for an engine approximately 1,000 c.c. is extremely good). In the sidecar class, in twenty-five trials, the mileage ranged from 49.64 to 98.8 m.p.g. In the lightweights there were very few competitions reported. The greater economy of the heavyweight four-stroke over the lightweight two-stroke is obvious from a comparison of the figures given in the report from Allentown, Pennsylvania, which is summarised below:

HEAVYWEIGHT SOLO.—1, 107.6 m.p.g.; 2, 88 m.p.g.; 3, 87.2 m.p.g. (All Harley-Davidsons.)

HEAVYWEIGHT SIDECAR.—1, 75.6 m.p.g.; 2, 73.6 m.p.g.; 3, 68.8 m.p.g. (All Harley-Davidsons.)

LIGHTWEIGHTS.—1, 77.2 m.p.g.; 2, 74.8 m.p.g.; 3, 74.4 m.p.g. (All Cleveland two-strokes.)

CURRENT CHAT

SPECIAL FEATURES

SOME UNCONVENTIONAL VALVES. THE MOTORISED BICYCLE.
THE GUNS OF FIGHTING PLANES.

TIME TO LIGHT LAMPS

SUMMER TIME.

Aug. 15th	... ...	8.52 p.m.
,, 17th	... ...	8.49 ,,
,, 19th	... ...	8.45 ,,
,, 21st	... ...	8.41 ,,

An Aphorism.

"Those who ignore the rule of the road adopt the *rôle* of the rude."

Petrol "Caches."

We heard of several cases of holiday riders leaving petrol at various points on the outward journey, to be picked up on the return.

Age of Drivers.

The new regulation reducing the age of drivers for motor vehicles, "on proof of competency to drive," does not affect the age limit of motor cycle drivers, which is still fourteen years.

Second-hand Motor Cycles.

It is good to learn that various representatives of the industry are meeting Government representatives to consider schemes to prevent a post-bellum flooding of the markets with motor cycles of all descriptions and in all conditions, to the detriment of all concerned.

Doing it Properly!

A farmer was recently summoned for illegal use of motor spirit at Woodhall Spa. The Bench not only dismissed the case, but paid the defendant £1 1s. as compensation for the loss of his day!

What will the munitioner say on hearing that a farmer, of all people, has scored in a petrol dispute?

Overloaded Passenger Machines.

Nearly every sidecar outfit seen during the past week-end was seriously overloaded, three up being quite the usual thing; but a Harley outfit, going well, with five on board (three adults, two children, and luggage), was the limit. A Morgan with four adults and luggage was seen at one point; how all passengers were fitted in the standard body remains a mystery.

August Holiday on the Road.

The number of motor cycles seen on West Midland roads during the holiday week has not been large. True, there were more than usual, and the obvious joy-riding appearance of the riders gave evidence of many munition worker permits in use.

In the course of a run between Cheltenham and Birmingham on Bank Holiday, approximately thirty solo and sidecar outfits were seen. Many more were seen in the neighbourhood of Worcester and Gloucester on the previous Saturday, but the general exodus from the Midlands has been principally in the direction of North Wales.

Crowded Midland River Resorts.

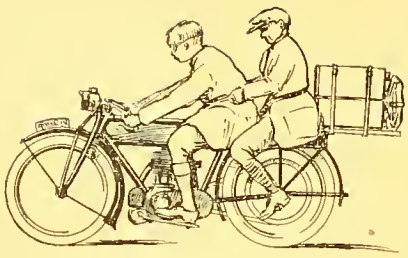
All the well-known Avon and Severn river resorts have been packed to suffocation during the holiday week. Stratford, Bidford, Evesham, Worcester, Bewdley, and all the villages in between have been besieged with fresh air seekers. The scene from the bridge at Evesham was reminiscent of a Henley Regatta crowd. Motor cycles were much in evidence in all these districts.

Home-produced Fuel.

"English Oilfields, Ltd.," is the name of a company recently formed, with a capital of £300,000, to exploit an area of Norfolk, near to the Wash, for shale oil. Investigations have warranted the enterprise, and, we are informed, oil of a high quality and easily extractable has been found by means of an experimental plant erected some time ago.

This company is a purely British undertaking, and as the area under its control is some twenty square miles in extent there is plenty of scope for subsidiary companies to take over smaller areas within the main area, and work under the auspices of the parent company.

Not a Tank picnic, but a kit and equipment inspection at a Tankdrome.



SEEN ON THE ROAD ON BANK HOLIDAY.

Two tins of petrol on an extension of the carrier. The passenger appeared to be experiencing considerable discomfort, and the steering was decidedly wobbly

Removing Enamel.

In re-enamelling sidecar frames, etc., a good way of removing the old enamel is to give the parts a good soaking in a strong solution of hot water and soda, when it will be possible to wipe off the enamel with a rag soaked in petrol.

Routes.

Making all due allowances for present conditions, we have been surprised at the large number of requests for routes that reached us prior to the recent holiday. North Wales as the objective came an easy first, though one reader was going from the Midlands to the East Coast per pedal cycle, as he could get no petrol

A Stiff Climb.

It would be interesting to know whether Bredon Hill has been crossed by motor cycle. In the course of revisiting some Worcestershire and Gloucestershire beauty spots recently, we crossed the hill on foot from Kemerton to Elmley Castle. There is a public way, but the field tracks on the top are somewhat difficult to find. It affords a hard climb of nearly two miles, with a shorter descent on the Elmley side. It is not new ground, as a sidecar outfit was noted, stabled at a house about two-thirds of the way up, but the complete grind over the hill should form a good stunt suitable for inclusion in a post-war club trial.

Petrol—for Hun or British Soldiers?

A Birmingham body recently sent a protest to the Petrol Controller because Hun prisoners were conveyed about the town in motors, while soldiers arriving in the town late at night or early in the morning had either to walk home or wait till later in the day, as the Petrol Controller had refused petrol to the local V.A.D. Motor Transport, who had been conveying the men to their homes before the Petrol Controller stepped in.

The Petrol Controller has replied to the protest, striking an almost triumphant note and stating that the V.A.D. M.T. were offered an allowance of fifty gallons per month, which they refused!

It is a striking, if superfluous, commentary on the mentality of the average Government official that he should wonder why fifty gallons a month should be refused for such good work. Fifty gallons, considering the number of cars used and the distance travelled, were not likely to be of much use

Cost of Post-war Motoring.

While there is little doubt that the cost of the post-war sidecar outfit will be higher than that of the pre-war model, "Runabout," writing in *The Autocar*, states that some manufacturers are seriously considering the possibilities of a £75 car. If these ideas materialise, what will be the future of the sidecar *de luxe?*

The Motor Cycle in Japan.

A Japanese aviator has invented a motor jinrikisha, presumably on motor cycle lines, which made experimental runs near Tokio. He anticipates a large market for it, as the Japanese people are so accustomed to the jinrikisha that an adaptation of it would appeal to them far more than would a motor car proper, which would not be suitable on account of the narrow roads.

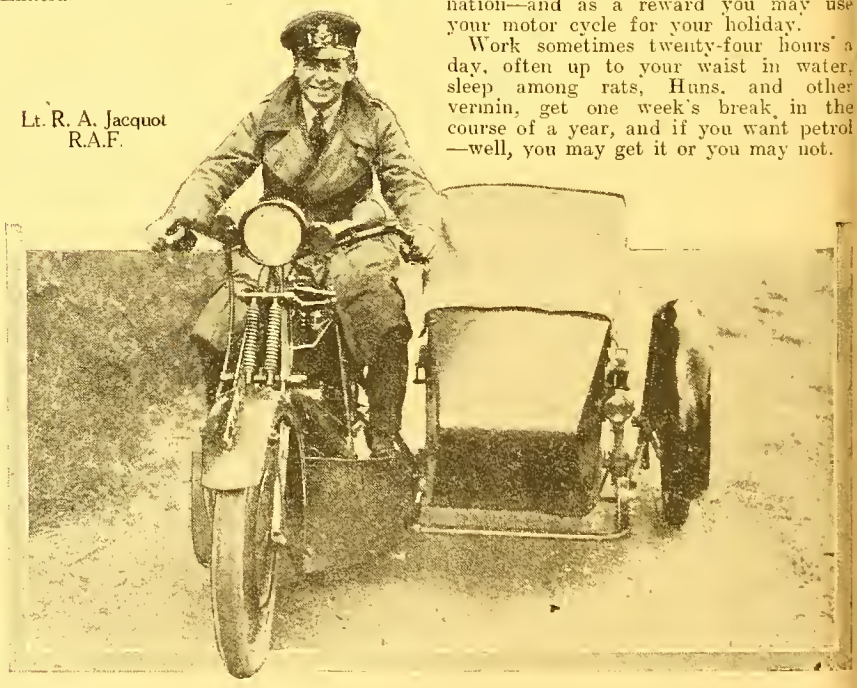
A Fascinating Tour.

The following is the beginning of a touring article recently submitted to us as likely to interest the readers of *The Motor Cycle:*

"I have not had the pleasure and honour of competing in the annual reliability test race over the classic ground across England 893 miles longitude, from Land's End, in Cornwall, to John o' Groat's, in Devon, but my record displays an aggregate of far greater mileage."

Lt. R. A. Jacquot.

The terrible experience of Lt. R. A. Jacquot will be remembered by many. Whilst patrolling in a seaplane he was forced to descend on account of mist. He made his descent about 100 miles from land, where he and his observer, Lt. John Dixon, remained for three days and nights on the upturned seaplane. They had given up all hope when a destroyer picked them up. He is now home on sick leave and making good recovery, thanks to his 6 h.p Enfield.



Lt. R. A. Jacquot R.A.F.

Petrol for Holidays.

The concession which allows munition workers who hold petrol licences to use their machines for proceeding to and from the places where they are spending their holidays has been extended to coal miners and to workers in dockyards.

The Sidecar and the "Movies."

The sidecar has appeared in the British-produced "movie." In *The Labour Leader* Miss Fay Compton drives a twin-cylinder combination in an all-leather airman's suit and looks very charming, but would create a sensation if she appeared in such a get-up at any of the motor cycling rendezvous.

A Genuine Munition Worker.

The proprietor of a firm engaged on munitions recently applied for a holiday permit but was refused, as he was not a genuine munition worker and his motor was a car; also, he intended to make his holiday trip into a business journey. His lady typist, who owned a motor cycle and sidecar, also applied for a holiday permit—and she got it!

True but Strange.

Police ignorance of motoring matters is well known. This is an instance. Being summoned for riding without lights, a defendant explained to the sergeant at the police office that his acetylene generator had run dry. The sergeant, however, insisted on proclaiming to the court that the cause was "engine trouble." Fortunately the bench knew no better, and proved very sympathetic

Petrol—for Whom?

Letters in our correspondence columns force one to think unkindly of those who control our riding destinies. Work ten hours a day, go home at night after a "show" to a comfortable bed, and receive wages that would make envious some of those important officials who partially control the destinies of the nation—and as a reward you may use your motor cycle for your holiday.

Work sometimes twenty-four hours a day, often up to your waist in water, sleep among rats, Huns, and other vermin, get one week's break in the course of a year, and if you want petrol—well, you may get it or you may not.

THE MOTOR CYCLE

AVIATION SECTION

Which Wheel will Lift? Strafing a German Sausage.

Sighting Submarine Spotters.

How many amateur "observers" will see in some of the coasting submarine-spotting-airships our latest Zepps?

—◇□◇—

America and Air.

It is alleged that there are 150,000 men in training in the American Air Service, and that they are divided among some thirty training stations.

—◇□◇—

Some Output—on Paper.

Some factories in the States are arranging to turn out "not fifty engines per week, but fifty to a hundred a day before the end of September."

Why *does* not the poor Hun make immediate overtures for peace?

—◇□◇—

Some Output—Actual.

Up to the date of the announcement of the above figures the total number of Liberty engines produced was 2,000, and for the first week in June the total output was 115.

—◇□◇—

Joseph's Coat.

Owing to the sensitiveness of the new R.A.F. cloth to sunlight, it is suggested that the tunic, instead of being indented for as "jacket, field service, officer's, for the use of," it should be simplified to "Joseph's coat."

The back and shoulders will probably become an æsthetic green, retaining its original blue in more protected areas; the front will be gracefully decorated with streaks of oil added to the gilded ornamentations of rank stripes, badges, and buckles in various shades of tarnished brass.

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Which Wheel will Lift?

The most hackneyed question that reaches our technical information department is: "Which wheel, the inner or outer, will tend to lift as a car or sidecar combination rounds a corner?" In spite of the number of times the answer has been published, there are many readers who insist on regarding the outer wheels as the culprits.

A good illustration of the working of this infallible, if often doubted, law was seen recently in Coventry. An aeroplane (less wings and engine), in tow of a light lorry, was rounding a sharp left-hand corner at a speed of about seven miles per hour. The inner wheels lifted, and the plane, attached to the lorry by its tail skid, fell a crash on its left side, damaging the engine cowling and the fuselage.

Weights: Some Comparisons.

Aero engines ..	...	1 h.p. =	2½ lb.
Car engines .	.	1 h.p. =	15 lb.
Steam engines .	...	1 h.p. =	450 lb.

Not so bad!

—◇□◇—

The Atlantic Flight.

If the Atlantic flight eventuates this year, what is to become of the *Daily Mail's* £10,000? The flight is certain to be carried out by the American Air Service, which is keen on establishing its own "traditions," and cannot accept private awards!

—◇□◇—

AIRMEN MOTOR CYCLISTS

We were very pleased recently to have had the opportunity of a long talk with Lt. M. A. J. Orde, son of the Secretary of the R.A.C., who has now been repatriated from Switzerland, where he was sent after being two years a prisoner in Germany.

While flying over the German lines near Cambrai, his attention was diverted by the antics of one of our machines in front of him which was endeavouring to avoid shell fire. He did not notice that a Hun machine was above him until he was bit in the neck by a bullet. While descending, another bullet grazed his head, rendering him unconscious, and he only recovered his senses just in time to make a good landing. During his first year in Germany his treatment was not so bad, but later on he was moved to what he refers to as "a strafe camp," where the treatment was abominable and everything possible was done to render the officers uncomfortable. While there he saw a good deal of H. R. Davies, the well-known Sunbeam rider, who tied for second place with Godfrey in the 1914 T.T. Davies began his military career as a despatch rider in 1914, then got a commission in the R.E.'s, and was later transferred to the R.A.F., and was subsequently shot down while flying. Lt. Orde also met a man who saw Godfrey's machine blown to pieces by a shell. This is apparently the first authentic news of poor Godfrey's end. He was reported as missing, and thereafter no news was heard of him. It appears that the shell made a direct hit, as no trace of the machine was discernible after the explosion. At the Hun camp where Lt. Orde met Davies, fourteen officers were lodged in one hut, and only one orderly was allowed to sixteen officers. They would have starved had it not been for parcels sent from home, and in the winter time the heating was quite inadequate. Orde will be remembered as the enthusiastic rider of a 3½ h.p. single-geared T.T. Rover which he entered for a good many competitions.

Lt. M. A. J. Orde, R.A.F.

—◇□◇—

Strafing a German Sausage.

So they term the Adjutant Bloch, a "poilu of the blue." Having escaped "the eye, piercing and terrible," of the enemy artillery, he and his *escadrille* cast about for prey.

"I perceive a gross, grey sausage swaying sullenly below me. With calm I regulate my aim and let go. The bomb skims it closely. Below the assistants wind in with rage; the shrinking drachen cowers like a whipped dog." (Lest you should think our *gascon* a swaggerer, let it be mentioned that he has three citations for extreme valour, which, in his own words, "are not gratis.")

"At this moment the cannonade bursts, and we ride in the fury of a storm, like the Valkyrie. The incendiary sprays of the enemy mount around us like sheaves. The machine rocks, as a small boat in a heavy sea; a black form passes me, spinning over and over. It is a great *obus*, which, arrived at the top of its trajectory, turns. It descends 500 metres and explodes. The air smells of melenite. I pass above a drachen, patched with colour like a harlequin. I sight. Boum! A sinister flare, a cloud of rolling smoke, he is not.

"We make the return, well pleased. Unhappily, two machines remain in Bochie, and two comrades are wounded. For the work done we pay the price, and the Colonel felicitates us."

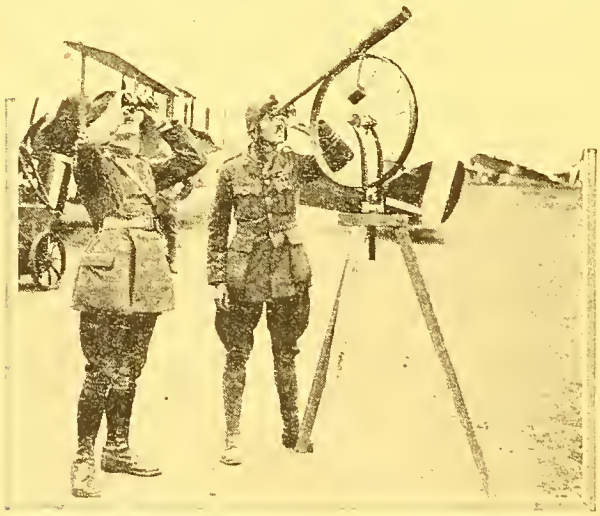
THE GUNS OF FIGHTING PLANES.

THE EVOLUTION OF AEROPLANE ARMAMENT.

~ BY TORQUE. ~

IN previous articles I have written as if a fighting scout carried but one gun. This deception was inspired by deference to the Censor, who had not then "released" all the information which was common knowledge, and it is now possible to speak more frankly. In 1914 pilots occasionally ascended absolutely unarmed, and the maximum armoury consisted of (1) a rifle, (2) an automatic pistol, and (3) several small bombs or hand grenades, with which at that time it was thought enemy planes could best be crashed. I have never heard that a plane was ever brought down by dropping a small bomb upon it from above, but Capt. Ball is alleged to have shot down a Hun with a service revolver, after exhausting his machine gun ammunition.

Before very long a Vickers machine gun became the regular armament of every aeroplane. For a time some doubt existed as to the best way to use it. If it were fitted in the nose of a tractor machine, an interrupter gear was necessary to prevent the propeller from being holed when its blades passed the muzzle as a bullet emerged. The early interrupter gears were fruitful sources of trouble: sometimes they jammed and put the gun right out of action; sometimes their timing became deranged, and they "did in" the propeller very rapidly. All these difficulties have long since been overcome, and the sole surviving problem centres round the design of lightweight gears, suitable for rapid mass production. At the outset, however, the gears were so tiresome that many authorities preferred to use pusher machines, thus dispensing with the gear altogether, and giving an uninterrupted field of forward fire. The pusher scout is now dead, and the tractor, with an interrupter gear, is standard practice.



A unique telescope stand seen at an aerodrome in France. The front forks and rim of a cycle were utilised in the improvisation.

The next advance stands, I believe, to the credit of the Hun, who originated the practice of fitting twin machine guns, one on each side of the nose, and operated by a double interrupter gear. Rather before this the observer in the rear cockpit was equipped with a light automatic rifle, the Lewis gun being adopted in the British service.

Operating the "Third Gun"!

The next experiment is specially associated with the name of Capt. Ball, who used it with deadly effect. So long as scouts were fitted only with guns which fired straight ahead, victory went to the "top dog." The machine with the upper position had the full benefits of the extra speed afforded by diving at its disposal, and could attack with a vantage or break off a fight with considerable ease. Some of our pilots schemed and plotted how to increase the offensive possibilities of the underneath position, and a third gun, fitted on a swivel mount attached to the top plane came into vogue. Ball used to attack as though he meant to engage with his fixed fuselage guns, suddenly dive under his victim, and fire up into the Hun fuselage with his top plane gun.

This "third gun" is not popular with all pilots, and it is by no means every pilot who can use it. It is not often that the assailant can hope to roar along beneath an enemy who is flying continuously along a

The Guns of Fighting Planes.—

straight path. The chance of getting in a burst from the top gun is always incredibly brief, and demands a remarkably quick hand and eye, especially as the machine has to be manœuvred all the time, and the two forward guns are quite possibly in action up to a few seconds before the moment at which the top gun must get a burst in if it can. Only a superb snap-shooter, with uncommonly deft hands and a lightning brain, can get the best out of a top gun. In addition the "drag" or wind resistance of a top plane gun and its mounting makes a very appreciable difference to the speed. However, the number of men who can make deadly play with the third gun is now sufficiently great to compel every scout pilot to master it if he can. A two-gun pilot does not enjoy much of a betting chance in single combat against a crack three-gunner.

Machine Gun or Pom-pom?

The big multi-engined planes are, of course, rapidly developing into regular flying batteries, and bristle with machine guns of the pukka Vickers type, or of the lighter Lewis pattern, which your true machine gunner still stigmatises as an "automatic rifle." Larger weapons than either are beginning to appear, and it is probable that the next war will see specially modified field artillery mounted on aeroplanes. As yet nobody has got further than the "pom-pom" type. Major Bishop records in his "Winged War-

fare" how surprised he was one day to find little white puffs round him, and to realise that a Hun two-seater was popping off one-pounder shells in his direction. A little experience showed that the new German gun was not at all dangerous, and he soon learnt to prefer it to "the wicked rattle of a pair of machine guns, with their smoking bullets whining by."

The possibilities of a one or two-pounder gun rest in the fact that a well-placed shell will certainly shatter a longeron or wreck an engine, whereas a .303 bullet can perforate most parts of the 'bus without doing serious harm. On the other hand, the pom-pom fires at a comparatively slow rate, and a scout machine cannot take up an unlimited store of shells. Success in employing bigger guns on aeroplanes must depend very largely on damping out the recoil. The thrust of such a gun has got to be taken by some part of the 'bus, and as long as the big gun does not absorb its own recoil, it complicates the design of the machine extraordinarily.

FLYING FACTS AND THEORIES.

SPEED JUDGING.

By W. G. ASTON, A.F.R.Ae.S., A.M.I.A.E.

DIFFICULT as are many of the problems concerned with aeronautics there are few which for genuinely fundamental knottiness compare with the judgment of speed, whether it be from the standpoint of the man on the ground who is viewing a passing machine from below, or from that of the pilot who is flying over more or less unknown country. So far as the former spectator is aware, the aeroplane he perceives may be of any size and at any height, and he is thus in possession of apparently rather less information than is the aviator, who, at all events, has a record of his height which, while making no pretensions to exact accuracy, is sufficiently near for most practical purposes. He also knows more or less exactly his air-speed, but what we are concerned with in the present consideration is land speed, *i.e.*, air speed plus or minus wind speed as the case may be.

In the case of the ground observer judging the speed of a machine in the air, the problem is of more interest than importance, though it is one which the expert Archie operator may be called upon to solve in a rough and ready sort of way. It must be admitted from the start that in the absence of measuring instruments of the sextant and theodolite type, the problem is completely insoluble unless the aeroplane can be recognised and identified. In this event one may at least know some of its dimensions, but, failing this information, the most one can do, by using a stop watch and timing it past two arbitrary points, is to say that it is covering so many times its own length per second. But, even so, the machine must be observed when flying past one, either in the distance or directly overhead, otherwise if it is going away or coming towards the observer the observation is stultified by the effect of fore-shortening. If the machine is overhead it can be timed past two points, say the first and second knuckle joints of the first finger, the hand being pointed towards the aeroplane and the arm outstretched. Since one is only measuring *lengths* per unit of time, the distance of the fixed points from the eye is immaterial. Incidentally one may mention that this idea of measuring speed by lengths is the natural and instinctive one, and it is for this reason that a small machine always appears to be travelling more rapidly than a big one, even though in point of actual fact it may be considerably slower.

Ground Speed and Bombing.

The judgment of ground speed from the air, in the absence of landmarks whose distance apart is known, is exceedingly difficult. Though the future will no doubt produce instruments which will readily and accurately give the information required, so far as I know there is none in existence at present. Now ground speed is an important factor, especially in connection with the dropping of bombs, and also, of course, in relation to the covering of distances according to pre-arranged timetable. If the pilot knows the direction and speed of the wind the problem is easily solved—roughly at all events, for it must be borne in mind that the air speed indicator reading requires correction for barometric pressure and temperature—

Flying Facts and Theories.—

but unfortunately there is no means of knowing these factors for certain once one is in the air. Even if two known landmarks are observable the solution can only be got approximately, for this reason that the pilot cannot tell when he is quite vertically over either of them. And the higher he is flying the more is there likely to be an error. Supposing he fixes two sights on the body of the machine he has no guarantee that they will even be vertically in line, since his machine is constantly pitching. To rotate through an angle of 5° might be almost an imperceptible movement, but if this occurred between the two landmarks it would, given a fair height, introduce a serious error.

Judging Speed by Observing Landmarks.

To measure land speed by means of landmarks requires, first of all, an observation platform which is always horizontal, and this in itself is not obtainable by any simple means. No pendulum arrangement can possibly give it, and a gyroscope has the disadvantage of being both big and heavy. Of course, if objects very far apart are taken, say the towns of London and Birmingham, ground speed can be worked out with great accuracy, but here the trouble is that the time taken for a single reading is altogether too excessive, and since the figure represents the average over a long period there is no security that it will be maintained either for the next minute or the next hour.

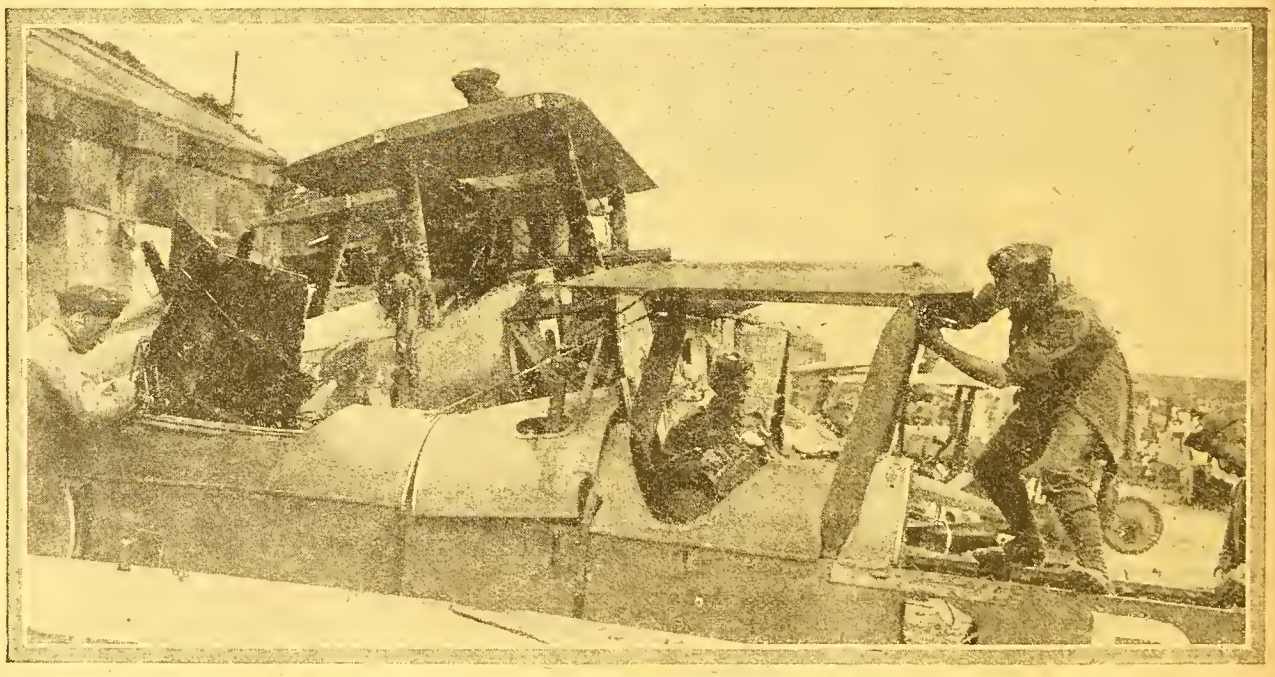
Another factor which comes in and helps to make the matter more complicated still is this, that flying level, even for a comparatively short distance, is by no means the easiest thing in the world, for it requires the maintenance of absolute steadiness in the dials of three instruments—the rev. counter, the air speed indicator, and the aneroid. Nothing is gained or lost so imperceptibly as height, and a very slight temporary inclination of the flight path to the horizontal would make, of course, a considerable difference one way or the other to the speed figure which has to be ascertained.

The Weakness of the Barometer.

I have remarked that, thanks to his barometer, an aviator has a rough idea of his height above the ground, but it is only a rough one, inasmuch as what the aneroid really indicates is not a dimension at all, but only atmospheric pressure. Even so, however, it might be thought that if he could observe a point below him with some convenient sighting instrument, and could then measure the angle through which he had to alter these sights after flying, say, for five seconds, he could by means of prepared tables get an immediate reading of his ground speed. But here again not only does the inevitable pitching of the aeroplane make accurate observation impossible, but even if this were not the case, the difference between aneroid height and real height may easily be quite sufficient to introduce an error too large to be neglected.

Since the subject is so hedged around with difficulties it is perhaps as well that it is not a vitally important one except in special circumstances. In the ordinary way the provision of thoroughly good maps and a proper system of landmarks would be all that is practically necessary, though needless to say this does not solve the difficulty when one is flying over the sea.

Mr. Coffin, past president of the S.A.E., recently stated at a dinner given at Dayton, Ohio, that the Liberty engine develops 50 h.p. more than the product of a British firm employing 10,000 men and turning out fifty engines per week, and that the Liberty engine weighs 100 lb. less. *Sal sapit omnia* is our only comment, unless we add, "Salt is white and pure: there is something holy in salt."



AN AEROPLANE HOSPITAL.

Damaged machines being repaired at an R.A.F. depot on the Western Front.

PRO PATRIA · II ·

Further Notes from a Sidecar Ambulance Driver serving with the French Army.

IT was 3.30 a.m. when I picked him up—a poor old French territorial, shot through the lungs, but silently patient as we transferred him from the dressing station stretcher to the sidecar. Poets and naturalists talk about the beauty of the dawn, and dwell upon the fact that those who do not rise early miss the most glorious time of the day, but all I can say is—I have seen enough dawns, and when the war ends I shall studiously remain in bed till the roads are aired. Dawn may be all right when one witnesses it after a good nine hours' sleep, followed by a cup of hot coffee and a round of toast, but when one is wakened from one's first sleep by the light of a flash-lamp in one's eyes, told to turn out in the third hour of the morning, though it was already the first when one retired, dawn takes on a different aspect. Wonderful and golden and fresh and youthful it may be, like an hour from one's twelfth year or thereabouts, but there is a desolate greyness about it—especially when the sight of bloody bandages, the rattle of the mitrailleuses, and the "ping" of trench torpedoes herald its arrival.

He is an old territorial, severely wounded, as I say, and as we wrap him in our sheepskin and finally pull the cover over the sidecar the young doctor urges me to hurry away.

"There is gas here," he says, pointing to a fresh and shallow shell-hole a yard off the road. "It is not good for the wounded. See—yesterday they dropped a trench torpedo there"— and he points to a group of wrecked and ragged shanties twenty paces away. "It killed four and wounded six. It is not a good place this."

"Corduroy" and Trench Torpedoes.

We start up the engine and slowly insinuate the clutch, gliding off the uneven corduroy at snail's pace. Of all surfaces corduroy is the worst when it comes to transporting wounded, the rapid, vibrating jolts being more painful than those inflicted by the jagged boulders that protrude from the chaos of ruts that characterise the battle front routes in summer. And as we draw off there is a deafening, ear-splitting concussion behind us, which seems to strike one across the back of the neck with a flat hand, and we know that another torpedo has fallen, and that others will follow. Slowly, methodically dodging a shell-hole here and a miniature range of jagged Alps there, we draw away, for when one's passenger is shot through the lungs one's only course is to move slowly and to keep moving.

That Illusive Word!

Here, on the right, the camouflage hedge has been blown away for twenty paces, and we look straight down into Boche land. It lies beneath us, a wonderful panorama, aflame with white and yellow flowers, with only its stark and roofless buildings to indicate that destruction is abroad. We do not pause to admire the view, however, for we are slick in view of the Boche, who has the road enfiladed at regular intervals: but that glimpse of a golden countryside makes it difficult to believe that the Huns are there, that the territory is in their murderous possession.

Here is a camp under the trees, and as we approach a figure emerges from the shadows into the centre of the road. It is still night in the forest, but a murderous click warns us to close the throttle and lift the clutch.

The word? Good heavens, I've forgotten it; I always do. I murmur the word I was given two nights ago. But the sentry politely shrugs his shoulders, and smiles in a way that seems to say "guess again." I guess again and again, but still he politely shrugs his shoulders, his rifle remaining half raised.

"Name of God! Can't you see it's the ambulance?" I gasp at length. "The countersign is never necessary for an evacuation. Never!"

Another polite shrug. "The doctor is up in the camp, sir. You will see him?"

I say something about a dying man on the sidecar, and time being endlessly precious. But just then a figure appears in a pyjama suit from the door of a dug-out.

"Name of God, that isn't the Boche!" cries the figure, "it's the wounded. Let him pass."

Pro Patria.—

And the sentry politely bows and smiles. "Pass, monsieur."

It is only seven miles to the front line hospital, and we cover five of them on free engine, yet an hour has passed ere we get there. We notice the number of jay-birds on the road—they, the less timorous, being among the few of the wild birds to remain while their native forests are shattered and shaken by shell fire.

Fed Up.

At the hospital the officers are already astir. One of the doctors takes charge of our man, and we saunter off to sip coffee with another. He tells us that he is sick of the war and tired of life. He hopes that to-day a shell will fall upon him, or, failing that, he proposes throwing himself in the lake to-morrow. Finally he goes off, singing at the top of his voice, and a minute later we hear him rowing with the cook. "Always—always—always apple jam!" is what we catch. "I am sick of it at last!"

The officer on duty appears. "Will you take your man to the base, please, and shake him as little as you can?"

Not Cricket but—the Hun.

Now the road is moderately good, and we cover the fourteen kilometres in less than an hour. Not a sound has issued from inside the covered stretcher, and we peer in, fearing the worst. One does not mistake that look and the quick, rattling breath which indicate the need for urgency. As the French say, "he is smoking his pipe."

A stretcher bearer comes forth from the bureau at the gates, intent on asking our man a dozen futile questions, but we urge him to mount the carrier and come quickly to the surgery. "The man is dying, and an immediate operation is necessary," we explain.

Then as we ride through the grounds we see that the great Red Cross is torn up by shell holes, and that one of the new outbuildings is in ruins; but a minute later we wake the doctor on duty.

"A wounded, very grave, sir," we explain. "I have orders from the Médicin Chef to bring him straight to you for immediate operation."

The doctor flings out his hands. "But does the Médicin Chef know the condition we are in here?" he enquires. Last night, for three hours, the Boche bombarded the hospital. Our cars have been out all night, carrying the wounded to another base, and those who remain are down in the coal cellar—a dozen or so, too ill to transport, and who are going to die anyway!"

I shrug my shoulders. "We have received no orders to the effect that we are not to bring more wounded here, sir," I tell him. "If you are unable to attend to them, then we should have been told to take them elsewhere."

The doctor pulls on his socks. "Give me the papers," he says. "I will see what I can do. But it is very difficult. Some of our nurses are killed—many of our wounded were again wounded in their beds. Ah, it has been a terrible business!"

A Florence Nightingale.

We go out into the sunlight again. By the sidecar is standing a woman nurse. She is all in white, and her hair is tumbled about her shoulders, indicating that she has turned out ere her toilet was completed. She is not a young woman—thirty-five or so, and as she stands there, stooping over a dying man, there is something very womanly about her, especially when one sees at a glance that she is one of those British women who have given up everything: home, comfort, friends, to work among the French troops at an out of the way French hospital within range of the Hun guns. There is no public glory attached to such work, as there is for many at home who undertake work less arduous amidst home comforts, and it is real nursing, as those who know the French hospitals in the firing line will understand.

"Good morning, nurse."

She ignores the pleasantry. Her hand is on the wounded man's wrist. Presently she looks up. "I tell ye he is going to die in your sidecar!"

We hear nothing but the delightful Scottish drawl, reminiscent of the Tweed Valley and a hundred happy hunting grounds. A feeble voice under the hood asks for water.

"Ah, *mon petit*, and you shall have it presently," the nurse tells him, and her hand still upon his wrist she turns to me—"Why have you brought him here?" she demands. "We are not in fit order to undertake operations. Last night we were bombarded—it was really awful! We had to empty the wards, and many of the wounded died on the road. I shan't forget it ——."

We murmur some futile expression of sympathy. One is apt to feel a bit awkward when plunged into the society of the English-speaking fair sex after months of front line isolation.

"I am no more frightened than anyone else," the nurse goes on. "But it is beyond a joke. A shell burst outside the ward I was in and blew the glass all over the place. See ——"

She jerked back her sleeve and showed me an ugly gash just below the elbow, but a murmur from the sidecar attracted her attention again, and in an instant she was stooping over him, comforting him with those caressing terms that the French use towards their wounded, and that we ourselves might use when talking to a tired child. It was an impression which will last—a brave British woman stooping over a dying French soldier, using the endearing terms of his own language, even brushing the muddy hair from his forehead with caressing fingers.

"*La-la!*" she said at length. "I am afraid it is not of much use. He is—what d'you call it? See, I am forgetting my English."

She told me later that her husband had joined up when war began. Since then she had seen him twice in France. Then the inevitable question—how long will it last? Four years is a long time to be away from home. We shall all be old before we are free again, but "*La-la! C'est la guerre.*"

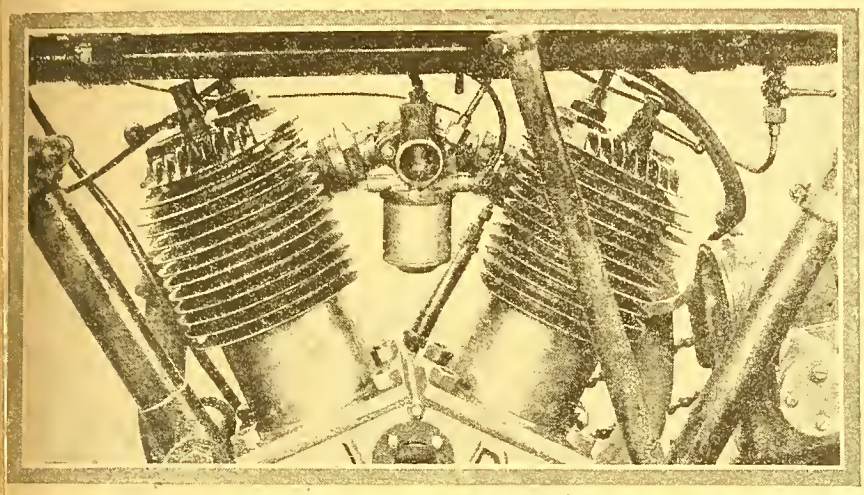
They took my wounded man in finally to operate on him in the coal cellar, and I went away bearing not a vision of beauty, surrounded by the golden dawn, but of a brave and cheery woman, who has given up what should surely be the best years of her life to toil among the *poilu*—one of those heroines of the war who demand no notoriety and who get none, but whose work is glorious as it is womanly. A Florence Nightingale, indeed!

CHINOOK.

AN INTERESTING CARBURETTER DESIGN.

Automatic Action with either Petrol or Heavy Fuel.

WE were lately privileged to see an automatic carburetter which is the outcome of the suggestions and reports made during the last year or two in *The Motor Cycle* concerning the behaviour of one-lever carburetters. It is the invention of two young engineers who, having had considerable motor cycling experience, realise the demand for this type of instrument, have studied the problem with intelligence, and have succeeded in producing a carburetter which gives quite remarkable results.



The carburetter in position showing entire absence of any heating arrangement

Unfortunately, we are not at liberty to give many details, though we are able to show two external views of the carburetter and one of the levers that control it. It has practically reached finality, and as soon as the war is over it will be ready to be manufactured in quantities, while it is interesting to note that it will cost no more to make than the ordinary two-lever carburetter with which the average motor cycle is now fitted.

The carburetter control. The long lever works the throttle, the small lever adjusting the strength of the mixture, so as to render easy starting and to compensate for atmospheric changes: when once set it need rarely be moved

So far as its outward appearance is concerned, we can only say that it somewhat resembles an American carburetter. It is fitted with a top float feed, and is of the single jet variety. Originally its designers had the idea of merely making a reliable and efficient one-lever carburetter, but in the course of their experiments they found the vaporisation was so good that they could burn any heavy fuel as easily as petrol, and without the necessity of warming the air intake in the slightest degree.

On the occasion of our demonstration the fuel used was ordinary paraffin bought at a shop. The auxiliary petrol tank was entirely disconnected, and as the engine was stone cold, a start was made on half a float chamber full of petrol. We were warned that there would be no appreciable change when the petrol was exhausted and the paraffin began to flow into the float chamber—a remark which was apt to cause some shadow of doubt in our minds.

The machine, a 6 h.p. Zenith and sidecar, was started by pushing off, and fired immediately. Within the first hundred yards the driver informed us that we were now probably changing over to paraffin, and that no difference could be noticed. This was actually the case. The machine ran the same as before—in fact, different in no way from any ordinary machine. There was no smoke from the exhaust, no knocking, and no smell of paraffin. The engine fired cleanly and crisply, the acceleration was good, the speed all that could be desired, and the slow running perfect—in fact, it was quite possible for the driver to walk beside the machine with each cylinder firing with absolute regularity.

Remarkably Economical Consumption.

The course we followed was five to seven miles in extent. This necessitated the negotiation of traffic and a ten-mile limit, and on this occasion the slow running was adequately tested. We finished up with a rather stiff hill, approached after negotiating a left-hand turn. While ascending this hill the machine accelerated to considerably over the legal limit, and then on the middle of the gradient was slowed down to about fifteen miles an hour, demonstrating that the engine gave ample power at slow speeds. When driving the machine we attempted to make the engine knock, but were quite unsuccessful in so doing, and found that the carburetter behaved just as a well-adjusted automatic carburetter should.

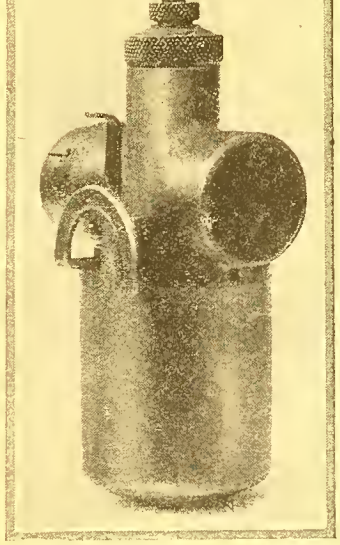
One of the illustrations shows a small lever adjacent to the long one. This is merely for strengthening or weakening the mixture. It will enable a strong mixture to be given off so as to ensure an easy start, and also permit of a small adjustment so as to compensate for atmospheric changes.

We were assured that, running on paraffin during the coldest weather, the 6 h.p. sidecar combination was consuming fuel at the rate of ninety-eight miles per gallon—truly a remarkable figure.

The Chances of Automatic Carburetters.

It is the wish of the designers that their names should not be disclosed at this period, nor should further details be published concerning the carburetter, but we give such information as is available so as to show our readers what is being done in carburetter design at the present time, and what can be accomplished by the automatic carburetter, about which so many of our readers are in doubt, owing to having had no opportunity of experience with this type.

It may be mentioned that the engine is fitted with a crank case breather instead of the ordinary release valve. This is fitted at the top of the crank case, exactly where the A. in the initials J.A.P. comes, and was removed at the time the photograph was taken so as to leave a clear view of the carburetter.



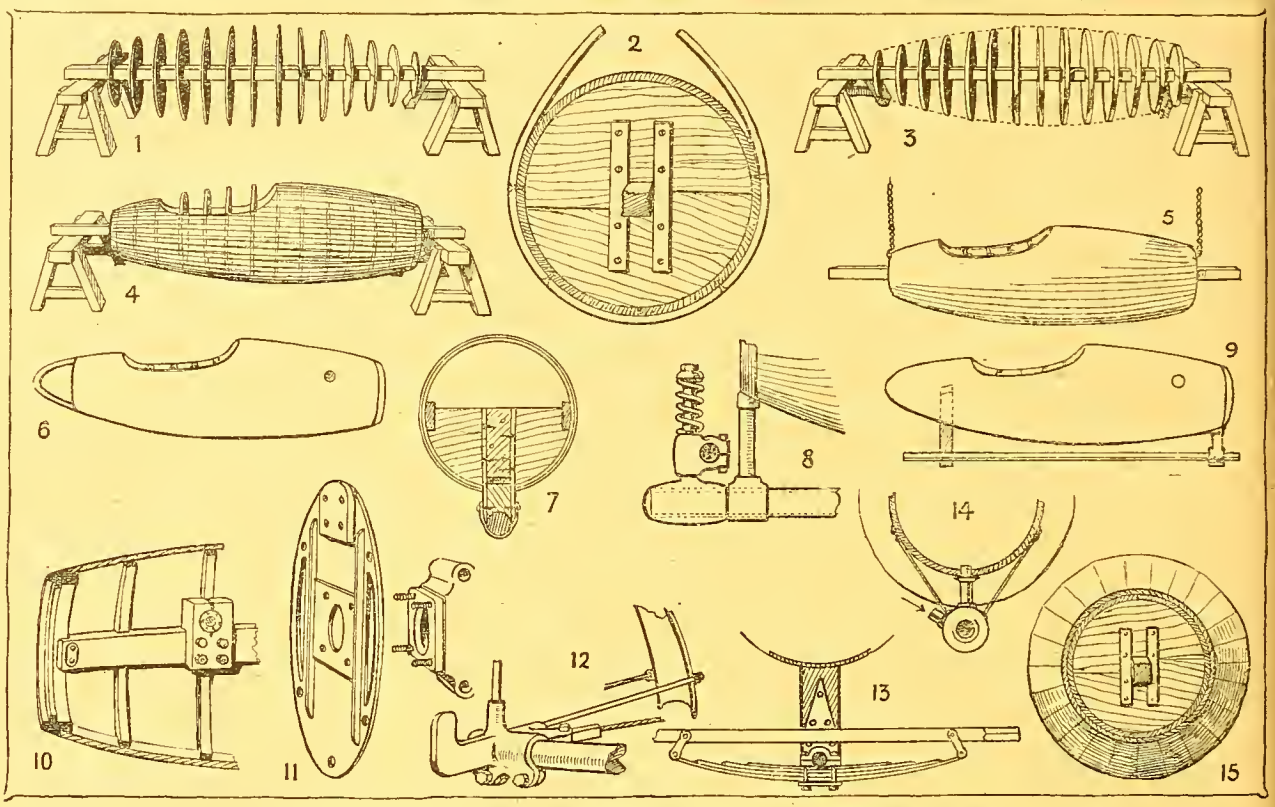
An exterior view of a rather earlier model. In the later model the adjustment shown at the side is controlled by the short lever on the handle-bar

THE GIBBONS CYCLE CAR.

Some Further Particulars of an Interesting Achievement.

THE article on the Gibbons cycle car, published in *The Motor Cycle* of June 13th, created a great deal of interest among motor cyclists, and a large number of enquiries have been received. The designer and builder—Mr. E. Gibbons, of 105, Harcourt Avenue, Manor Park, E.12—has now sent us sketches of details.

1. The mould upon which the body is formed.
2. The hoop construction of $\frac{3}{16}$in. × $\frac{5}{8}$in. hoops. The joint of the inner hoop is at the bottom, that of the outer hoop at the top.
3. The hoops in position on the moulds. These are bevelled slightly.
4. Planking screwed to hoops.
5. The moulds removed and the edges of "cockpit" stiffened.
6. Tail piece cut from solid wood. At this stage the body was covered with fine linen, secured by shellac.
7. Section showing back support.
8. The front axle fittings.
9. The body fixed to the "frame" tube.
10. Section of the nose of the body showing the metal ring to which the engine is fixed, also the wooden housing for the conntershaft.
11. The engine plate between the cylinder and the crank case of the 3½ h.p horizontal engine—the base for the magneto is shown at the top.
12. The lug to take the steering wire mudguard stays, and lamp.
13. The arrangement of back axle.
14. The front support from the single "frame" tube (2in.), which acts as an exhaust pipe, the gas entering where indicated by an arrow.
15. End view of the planking and hoops.



Detail sketches of the body construction and other parts of the Gibbons runabout.

A USEFUL MANUAL FOR MOTOR CYCLISTS.

"THE Amateur Mechanic," the Waverley Book Co., Ltd., 789, Old Bailey, London, E.C.4, 47s. 6d. A most excellent publication of undoubted interest and value to the motor cyclist. Though its cash price is high, it is splendid value for money, and the Waverley Book Co. have a system of extended payments whereby on the first payment of 2s. 6d. the four volumes of which the book is comprised may be delivered, and the balance may be paid by nine monthly payments of 5s., and a final payment of 2s. 6d.

"The Amateur Mechanic," so far as motor cycle repairs are concerned, does not satisfy the same requirements as a journal devoting itself entirely to the one subject, or to a handbook specialising in motor cycle adjustments, but it does what these publications do not do; it specialises in workshop processes which are not beyond the capacity of the average amateur, and deals with these methods at greater length than can be possibly done in such publications as *The Motor Cycle* and the instruction book it publishes.

In the book we have come across special articles which should interest our readers on such subjects as filing, screw cutting, either by lathe or by hand, how to use spanners, metal turning, metal spinning, a brief article on the overhauling of a motor cycle, another on the overhauling of a car, taper turning, home-made drilling machines, emery discs, bobs, and wheels, hardening, and fitting up a workshop for motor and general repairs. Now these are subjects in which the motor cyclist who is able to use his hands is especially interested, and he will find much to learn from such a well-written and copiously illustrated work.

The editor, Mr. Bernard E. Jones, wisely points out that the teaching power of illustrations has not been overlooked in the preparation of this work, and the reader will find that as much as possible has been left to the 6,000 odd photographs, drawings, and diagrams with which the pages are generously illustrated.

We have had a copy of this book in our possession for some years, and many useful hints and tips have been gathered from it. It should find a place in the library of every practical motor cyclist.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

PETROL FOR THE MERCHANT SERVICE?

Sir,—In your issue of August 8th I see munition workers are granted a permit to use their motor cycles.

I am a merchant service engineer, at present on leave for three days, and cannot get a permit. Surely we who have risked our lives since the submarine started its deadly work have as much claim as a munition worker, who has a feather bed and all other home comforts to go to every night. I have had a matter of twenty days' leave since twelve months last February (chiefly in three and five days). I may say I ran my machine on paraffin two years since, so only use petrol just for starting.

Can nothing be done to alter this glaring omission to men of the Merchant Service? A permit to use the machine, say, once in every three months, or to run between one's home and the ship, during stay in port, would go far to ease a lot of the strained feeling existing between the boys of the Red Ensign and the land lubbers.

ONE OF THE BOYS UNDER THE RED ENSIGN

STEAM MOTOR CYCLES.

Sir,—As a Colonial reader of your valuable journal, I should greatly appreciate information as to the name and address of one or more British firms who, I understand, manufacture model steam engines (bore and stroke about 2in. × 3in.), likewise component parts for them. Perhaps some of your readers can supply the desired information. I am also desirous of getting in touch with some concern which specialises in paraffin oil burners (small size) suitable for an 11in. × 14in. steam boiler.

The reason I am seeking such information is just this: I have in hand plans for a steam-driven motor cycle, and thus far have found it quite impossible to procure, either here or in the U.S., several fitments which experimental work of this description demands. Textbooks treating on the design and construction of flash or semi-flash types of steam generators are, likewise, things which do not appear to be "made in America." Any information as to where it is possible to procure such publications would be highly appreciated.

It seems more than probable that some of your readers, besides myself, have "had a go at steam"; can they not be induced to set down their several degrees of success, or failure, in writing, and allow them to appear in the pages of *The Motor Cycle?* An occasional article *re* steam (I recall only one in the four years I have been a reader) would make interesting and profitable reading, for, if I mistake not, there are signs gathering which indicate that the *steam motor cycle*, like the steam car, is going to be heard of in the not distant future. STEAM.

Toronto, Canada.

"CHINOOK" AND AMBULANCE SIDECARS.

Sir,—I should like to say a word or two *à propos* "Chinook's" article on sidecar ambulances.

In the first place, he writes: "The stretchers on the sidecars should always be interchangeable with those on the cars." Obviously, he did not give the thing as much thought as he should have done, or he would have realised that such a thing is practically impossible. It is necessary, on a sidecar, to have a rigid stretcher, or the jolting, which the machine gets on these mountain roads, would shake out the pin usually used to lock the cross-bar of a folding stretcher. Then again, can "Chinook" suggest a method for fixing the hood and apron on to the chassis of one of these machines? One could not spare the time to take the hood off one and fix it on to another while wounded were waiting.

I agree with "Chinook" absolutely and entirely as regards the inadequacy of the springing on our models; but do not let us have his comic friction shock absorbers.

If "Chinook" cannot tolerate gadgets of any kind, will he be kind enough to explain, to the world at large, why he fits so many? Unfortunately, for him, they are generally useless.

I, too, in common with "Chinook," would like to see our machines fitted with lighting dynamos and spring saddle pillars, but I am sadly afraid we shall never see them.

Wishing your paper the best of luck, T

TECHNICAL TERMS.

Sir,—As you remark in your preface to the article on "Technical Terms" in your issue of July 18th, the "meaning of certain technical terms is far from being correctly understood," but one would expect them to be understood and correctly expressed by the writer who sets out to "elucidate in simple language their individual meaning." Some of your contributor's expressions tend to leave a wrong impression on the minds of persons unacquainted with the subject—*e.g.*, when he speaks of an accumulator as an "electrical reservoir," while really it is a reservoir of *chemical* energy, which is converted into electrical energy during the period of discharge. This, however, is a small point.

More serious is his definition of 1 horse-power as "the *energy* (the italics are mine) that will raise 33,000 lb through one foot in one minute." Now power is not energy; it is the *rate* of generation or expenditure of any particular form of energy, or, as it is usually expressed, power is the rate of doing work. Thus a machine that can do 200,000 ft.-lb. of work per minute is twice as powerful as one that can only do 100,000 ft.-lb. per minute. A machine develops 1 horse-power when it does work at the rate of 33,000 ft.-lb. per minute.

Judging by the context, your contributor probably knows this, but he does not say it, and it is just this loose use of technical terms which is responsible for their being misunderstood.

Another erroneous definition is that in which the Board of Trade electrical unit is described as "one kilowatt per hour" One kilowatt *per* hour is as meaningless an expression as travelling at the rate of twenty miles an hour *per* minute. One can travel at the rate of twenty miles an hour *for* a minute or *for* an hour or *for* any other period, and in the same way one can use electrical energy at the rate of one kilowatt for an hour or *for* any other time. The point is the kilowatt is a power unit; it is a rate of doing work just as speed is a rate of traversing space, and to add per hour or per minute to either is simply nonsense.

B.E.F. J. H. SINCLAIR (Sgt.).

[We forwarded a copy of the above letter to the writer of the article in question, and the following is his reply: "The title of the series is, perhaps, a trifle misleading, for it may suggest that the articles are intended to be primarily technical. As regards the actual points mentioned, if a man knows very little of electricity, how would Sgt. Sinclair explain to him that the accumulators light his lamps by means of chemical energy? I think the Sergeant has rather run off the rails himself with regard to the second point, and as for the last, I think I can do little better than adopt a ministerial attitude, and plead a 'terminological inexactitude'"—Ed.]

MOTOR CYCLISTS AND THE ROYAL AIR FORCE.

Sir,—I must apologise for encroaching upon your space with matter relating to so hackneyed a subject as the above, but I felt that I could not let "Two M.T. Corporals'" letter in your issue of 18th July pass without comment. Their knowledge of the subject must indeed be limited when they talk of fitting a belt to a chain-driven P. and M.—the only machine the R.A.F. use out here.

Small wonder that "overhauls" are the continual nightmare of the poor non-technical R.A.F. privates.

B.E.F. ANOTHER M.T. CORPORAL.

Sir,—May we, a few R.A.F. motor cyclists in Palestine, add our voice, if a bit late, to the discussion in your columns, and endorse the views expressed by our comrades on other fronts?

In the first place, we owe your valuable paper a debt of gratitude for taking up our case as you have done. It is gratifying to know that we are championed by someone.

As one correspondent points out, it is quite apparent that to class a motor cyclist on service as non-technical shows a regrettable ignorance of his work. It is obviously not understood that a motor cycle needs constant attention to keep it in running order under the appalling conditions one meets with on Active Service, so that a man who can *ride* and do nothing else is more than useless. It is an everyday occurrence to be "hung up" on the road, and but for the rider's technical knowledge of his machine in getting it going again his despatches would go undelivered or be seriously delayed. We feel sure that this part of our work has been overlooked.

As to the statement by "A Few M.T. Fitters" that a motor cyclist is not allowed to adjust or repair his machine himself, this is too ridiculous to take seriously. We suggest that the fitters in question make a few enquiries before they "chip in." It also suggests another instance of that motto, "Blow *you*, Jack; I'm all right."

Personally, we can vouch for the fact that our machines have not seen a fitter or his shop since they left the base months ago, and from the fall of Gaza to the present time they have had a fearful gruelling and are still going strong. They have been kept in tune all the time by their riders—non-technical though they may be!

We would suggest that the reason for this sudden degrading is that whilst our real work as despatch riders is overlooked, we have come to be regarded as "orderlies," on account of the fact that we are called upon to act in that capacity whilst not actually riding.

In the circumstances, we think the least that could be done would be to place us on a footing with the D.R.'s of the R.E., giving us *some* prospects of promotion and higher pay, and, incidentally, more incentive to take a keen interest in our work as D.R.'s, *not* orderlies. We join with comrades of the B.E.F. and elsewhere in wishing the "Blue 'Un" every success, and trust that your support will go towards an improvement of conditions of the R.A.F. M.C.'s.

NON-TECHNIQUES.

PETROL FOR SOLDIERS ON LEAVE.

Sir,—Will another four years' war be necessary before this question is settled, or is the wording of the Act unintelligible? I commend the following to "Anti-submarine Patrol, R.A.F." I am an airman in a repair depot where we are all on active service, and two months ago I applied for a petrol licence when on service leave, which was refused, as I was not the registered owner of the machine I intended using. I replied stating that I was the registered owner of a motor cycle combination, but as it had been laid up for three years it would require a thorough overhauling and a new tyre, so a friend was kindly putting his car in order to be at my disposal. Then came this reply: "Petrol licences are only granted to soldiers on leave from active service *from Overseas*." The words in italics were underlined.

AIRMAN, R.A.F.

Sir,—Is nothing being done to ensure that the soldier home on leave from France gets his petrol permit without fail and without all this unnecessary delay?

The following case occurred recently. A soldier filled up and posted the proper application form on the same day as he arrived home. Although all the questions were answered fully, he received, several days afterwards, a query as to whether the machine was registered in his own name. He immediately replied that it was.

Nothing more was received from the Petrol Controller until four days *after* the soldier's return to France, when a consoling note arrived to express "regret that it is now, presumably, too late to issue a licence for the period of your leave."

I am aware that this case is not an isolated one. I have personal knowledge of parallel cases. That such scurvy treatment should be meted out by stay-at-homes to the boys who have to face the music over there, and who, if lucky, get home once in twelve months, is well—well, it is such that it cannot be described in language fit for publication in your paper.

FOUR CYLINDERS.

[A soldier or sailor applicant for a petrol permit should make his first application at least three weeks before he expects to come home, or, when this is impossible, he should call personally at 19, Berkeley Street, London, W.1.—ED.]

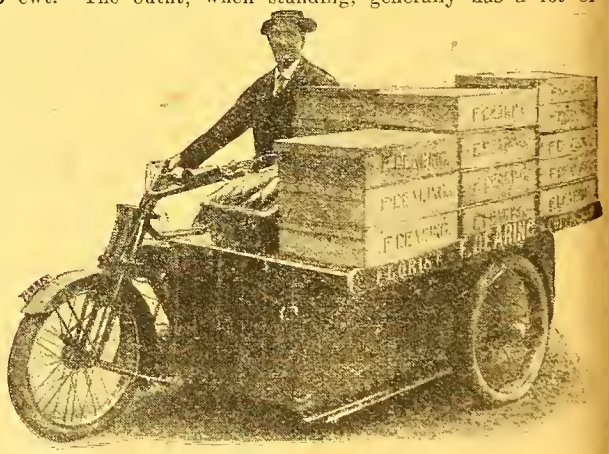
Sir,—When a motor cyclist joins H.M. Forces, he always has an unexpired portion of a driving licence and Revenue licence. Surely the Government can allow a soldier to drive a motor, on the strength of his past payments, for the short period of his leave. A friend of mine, after two years in France, came home for fourteen days. He had a three-speed Rover and sidecar in his garage, with a full can of petrol, yet he did not get a permit to use it till the morning he went away to France, because he did not pay a personal visit. I offered to let him use my machine—on which the Revenue tax was paid—but a driver's licence was necessary, according to regulations, so he borrowed or hired push cycles for himself and his wife to visit their friends.

I feel sure it is not the desire of the public to squeeze our fighting men as "Balmoral" relates, so I again suggest that no permit should be necessary to any soldier on leave who has petrol and has previously paid for driver's and Revenue licence, and that others who are owners should be granted a licence without the present trouble; and if we are at all likely to be bankrupt or lose the war because of our generosity to soldiers, sailors, and airmen, in all fairness issue Revenue and drivers' licences for the period of their leave at a proportion of the cost, as sportsmen used to be able to get a short-time game licence. Sixpence per week would cover the cost of all licences.

W.J.B.

A USEFUL SIDECARRIER.

Sir,—I send you a photograph which I think will interest you. It is of a 1914 Enfield which is running from Cottingham to Hull every day, and sometimes carries 5 cwt. The outfit, when standing, generally has a lot of



A practically designed sidecarrier.

admirers round it. I made the box for Mr. Dearing, the owner, who is seated on the machine, the only alteration to the outfit being the lengthening of the chassis. Mr. Dearing speaks highly of the machine, and does not know how he would manage without it.

SAM MISSIN.

EXPLOSION PRESSURE AND VIBRATION.

Sir,—I fancy your correspondent, R. W. Clarkson, is quite in error in supposing that the explosion pressure exerts a lifting effect on the machine through the cylinder in the case of a vertical single. It is quite true that a lifting effect is

produced, but this is because the balance is not perfect, and has nothing to do with the explosion pressures. Rapid revolution of the engine would produce the same effect without any explosion. If explosion pressures produced this effect it would be equally apparent in the case of a four or six-cylinder engine, and, of course, we all know that this is not so. The analogy of the rifle is not sound because the bullet does not—like the piston—remain in its cylinder or barrel; if it did its energy would be absorbed in pulling the rifle forward by its friction in the rifling, and there would be practically no kick. As the bullet leaves the muzzle with a high velocity its momentum will be equal to the momentum of the rifle in the opposite direction—hence, the kick. But this kick does not take place fully until the bullet has left the muzzle, otherwise the bullet would be thrown out of its proper course as the muzzle was jerked upwards. It is, however, true that the movement does begin while the bullet is in the barrel or it (the bullet) would not be influenced by what is known as "flip," which is present in the stiffest rifle barrels. The effect of this is to deflect the bullet slightly downwards.

To return to the motor cycle engine, I do not think that the rear cylinder of a flat twin has any braking effect other than that caused by balance, which tends alternately to produce retardation and acceleration, but I should like to have the opinion of "Mohandis" or some other authority on that subject.

JOHN HOLLAND.

RICHTHOFEN'S DIARY.

Sir,—The sight of a *British* lieutenant rushing into print hotly to defend a German airman against the *dreadful* charge of being shot down by a British (or Allied) airman is enough to make the gods weep and the cynical to persist in their asseveration that the British Government and Army authorities are more concerned to "be-kind-to-the-Germans" than to get on with the only thing that matters, *i.e.*, the winning of the war, in the only way this can be done, that is, in the words of the inspiring order which General Gouraud, "the lion of the Argonne,"-issued to his troops just before the Germans launched their new attack: "Every man will have one thought—kill them. Kill them in abundance, until they have had enough."

What a contrast, the determination of the brave and gallant French General, in what he knows is his necessary duty, to the flabby namby-pambyism that is so prevalent, to our shame, in England. It is this half-heartedness that is responsible for the war lasting as long as it has, and one is delighted to observe that the Americans, both in word and *deed*, are not tainted with this (virulent) "spare-the-German" poison, which shows its deadly results in the letters of Lt. R. G. McLeod, "Fair Play," and "Torque."

"Fair Play's" defence of Richthofen is confined to the statement that *one* fight (he mentions) proves him a sportsman, and in regard to my statement that Richthofen was a "baby-killing Hun," says: "Is this the opinion held of him by our Air Force?" May I point out that it is not *opinions* that count, but *facts*, and that neither "Torque" nor Lt. McLeod traverse my statement.

The substance of "Torque's" letter is that Richthofen "was by no means a bad sort for a German." In this regard, may I point out that my letter was *not* an attempt to prove Richthofen to be a "bad lot"—a Hun of Huns! It was simply written as a protest against an attempt to glorify and "crack up" this man as something extraordinary (probably this is *quite* proved by the making of the statement I quote, that he was not a *bad sort* for a Hun!)

I made no reflections on Richthofen's ability or personal bravery; these are a necessary part of *any* successful airman's "equipment." My protest was against an "appreciation" of a Hun airman on what, as far as the article went, appeared no grounds whatever!

"Torque" says: "Capt. Ball was of an *entirely* distinct type." Thank the gods he *was!* That is an admission by "Torque" that *entirely* proves my case. The contrast between the modest, unassuming and truly "lovable" British lad, second to *no* Richthofen in brilliancy of ability and daring bravery, and the "swanking," sneering Prussian circus hero, could be no better epitomised!

I am glad to hear that "Torque" is busy "sloshing" the Huns. More power to his elbow! May I ask him, if ever he has the chance, to put in an extra "slosh" for me, an "old crock" unable, alas! to do any "sloshing" on his own account.

In conclusion, Mr. Editor, may I say that I am *still* indulging in the "folly" of "wild prejudice" against a nation of men and women who commit, and approve of, and glorify the crimes and dastardly horrors and filthy deeds of which the Huns have been and *are daily* being *proved* guilty! Moreover, I hope I shall never see the day when I cease to "indulge" in that "folly."

Has "Torque" so *soon* forgotten Nurse Cavell, Capt. Fryatt, the *Lusitania*, Belgium, Serbia, the daily murders on the high seas, the raping and murder of women and children, poisoning of wells, and every filthy and devilish trick that even a Hun could imagine, and which I could fill *The Motor Cycle's* columns in recounting?

Much more to be admired is the pluck and *spirit* displayed by our merchant seamen, as exemplified by their sturdy leader Mr. Havelock Wilson, M.P. *They* at least know the Hun for what he is, and hold no illusions as to his being "not a bad sort." In the words of a song written for them by A. F. Herbert—

"Easy, matey, will the world forget
The dirtiest deeds that these have done?
The kings may pardon, the priests may pet
The carrion things they now call Hun.
But a man who's clung to a drifting oar
And watched for a sail all day,
He won't forget when there ain't no war,
To *Hell* with such as they!"

and so say all of us.

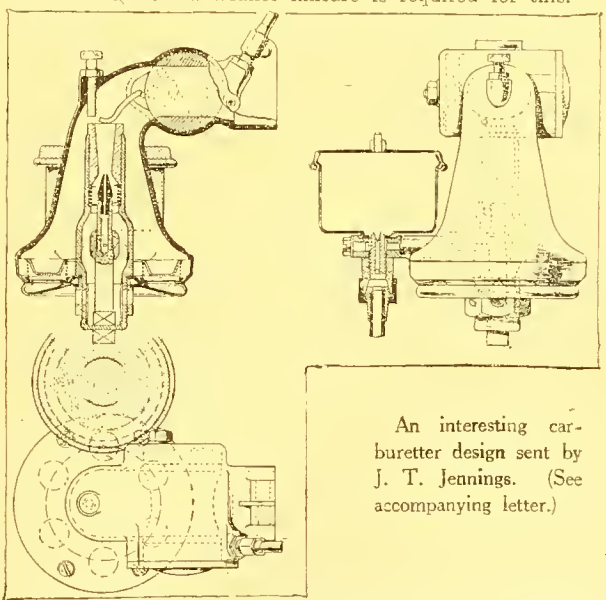
As "Torque" objects to my quotation, "the only good German is a dead German," may I submit another for his approval: The world is peopled by human beings—and Germans!

GEO. P. WADDINGTON.

ONE-LEVER CARBURETTERS.

Sir,—Your contributor "Rama," in your issue of July 18th, says: "A one-lever carburetter has to all intents and purposes one permanent setting only, for one particular engine speed, which admits a mixture calculated to run the engine at that speed and at its highest efficiency—and there is only one efficient speed with the mixture provided."

May I point out that the mixture which gives highest efficiency and power when taking full load does *not* give highest efficiency when the load is light and the engine is throttled down? A weaker mixture is required for this.



An interesting carburetter design sent by J. T. Jennings. (See accompanying letter.)

I have designed a carburetter that meets both this difficulty and the one referred to by "Rama." At *any* engine speed either of two mixtures is available—one that gives maximum efficiency when throttled down, and the other with fully open throttle. The utmost flexibility is in consequence a feature. In other words, easy starting and maximum power and economy at any speed are always there. The only troubles, which are very rarely experienced, are those common to all carburetters, viz., leaky needle valve or choked jet.

J. T. JENNINGS.

QUESTIONS & REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questioos bearing on technical subjects.

Hub Gears.

Will you please tell me the main objections to hub gears for sidecar work?—A.S.S.

The objection to hub gears compared with countershaft gears is that they are somewhat complicated, and, as they have to occupy such a small place, they are made to low margins of strength. Also in case of repairs being required, they are much more difficult to dismantle.

Misrepresentation.

I should be much obliged if you could give me advice on the following: I have just purchased an 8 h.p. Zenith combination for £75, which I was informed in writing by the seller was a 1917 model (late). On my sending the engine number to the makers they tell me it is a 1914 machine. Can I claim return of my money and send the machine back, or must I stick to it?—F.W.

You are certainly entitled to demand the return of your money, and if you wish to go so far and take the case into court, you would have no difficulty in getting your money returned, if you state your willingness to return the machine.

Clutch Adjustment.

I should be greatly obliged if you would give me a little information on the clutch and three-speed gears of a 1914 4¼ h.p. B.S.A. combination. I find that when I try to kick-start with the back wheel on the ground it is very hard to start, owing to the clutch being partially engaged, although I slip it out as far as it will go. Does this clutch want adjusting? If not, shall I do any harm to the machine by employing the following method: Put the back wheel on the stand, start the engine, then slip the clutch and put the gear lever in a neutral position (between the notches on the gate change). Take the machine off the stand, and, with a little push off, slip the gear lever into low with the clutch still disengaged?—B.B.

If you will look at pages 32-35 of "Some Useful Hints for Riders of B.S.A. Motor Bicycles," published by the Birmingham Small Arms Co., Ltd., Birmingham, you will see in fig. 4 reference is made to a small screw Q in the centre of the lock-nut on the end of the clutch adjacent to the end of the clutch control rod. Some difference in the adjustment may be also made by adjusting the lock-nuts at the further end of the clutch control rod. It looks, however, as if the clutch wants adjusting so that the plates are properly freed when the clutch is supposed to be out. There is no necessity for you to attempt to start the machine in the manner suggested in the latter part of your letter, as if the clutch is properly adjusted you will be able to start in the ordinary way without difficulty.

Cancelling a Sale.

(1.) A purchaser recently came to see my motor cycle, and agreed to pay for it a fortnight later, which he did. Now, as he has to leave his house he wants to cancel the sale and have his money back. Naturally, I am not inclined to fall in with his wishes, but he says he will take the matter into court if I persist in my present attitude. Also, he says he ought to have had a trial run, but he never asked for this at the time of purchase. (2.) Can I make him pay storage for the machine, which has remained in my garage till now, as the purchaser has no petrol with which to remove it?—J.P.

(1.) In our opinion the sale was perfectly straightforward, and unless the purchaser can prove misrepresentation on your part he certainly cannot compel you to cancel the sale and return his money to him. If he cares to take this to court we should certainly let him do so, as he will, without doubt, be unable to get a decision in his favour, provided there are no attendant circumstances that you have neglected to mention. (2.) You cannot now ask for payment for storage of the machine for the time since the purchase, unless you stated at the time the machine was left with you that you would expect payment for its storage. You may, however, inform the man that if the machine is left any longer you will expect payment at so much per week from a date a few days later than that of your letter. This amount you should claim in the court if the purchaser refuses to pay it.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

The Munition Worker's Petrol.

I am engaged as engineer manager by a London firm of constructional engineers, and am at present in complete charge of our contract at H.M. factory at ——. I have obtained a petrol licence through the recommendation of the Ministry of Munitions in ——. I live about eight miles from the factory; the nearest station is about one mile from where I live, and the factory is about another mile from its nearest station. I am not away from work in time to catch the workmen's train at night, which starts from a nearer station, and so have to walk to the other station, as there are no trams or other mode of conveyance. I have a doctor's certificate to the effect that I must do very little walking, owing to a bad leg. I have been rejected from the Army twelve times on this account. I forgot to mention also that after 6.15 in the evening the trains only run to —— every hour, so that under these conditions it is often eight and nine o'clock at night before I get home. Taking all this into consideration, and considering that the M.M. recommended me for a petrol licence to the Control Board, am I quite safe in running my machine?—E.G.C.

The question as to whether you would be absolutely safe in using your machine depends in the main on the intelligence of the policemen and the ruling of the magistrates. As these two factors are extremely variable, it is impossible to give any definite ruling, but we should say you would be perfectly justified in using your machine under the circumstances cited. The fact that you are a munition worker may help you.

RECOMMENDED ROUTES.

COVENTRY TO BLACKPOOL.—C.A.D.

Coventry, Lichfield, Rugeley, Stone, Newcastle-under-Lyme, Holmes Chapel, Knutsford, Warrington, Wigan, Preston, Kirkham (new road), Blackpool.

BIRMINGHAM TO BARMOUTH.—A.J.W.

Birmingham, Perry Barr, Brownhills, Crackley Bank, Wellington, Shrewsbury, West Felton, Chirk, Llangollen, Corwen, Bala, Llanelltyd, Barmouth, or Shrewsbury, Welshpool, Dolgelly, Barmouth (the more direct route). Another route from Birmingham is the following: Birmingham, Halesowen, Kidderminster, Cleobury-Mortimer, Ludlow, Montgomery, Welshpool, Dolgelly, Barmouth.

Water wont trouble — you —

If your bike is fitted with the ALL BRITISH

A.V.M agneto

BRITISH THROUGHOUT

Totally enclosed and absolutely dust, water, weather and fool proof

Don't take risks but get our folder F and spare parts list

C. A. VANDERVELL & CO., LTD.
Electrical Engineers
ACTON, LONDON, W.3

Economy of Fuel is Traditionally and Inseparably Associated with the

Humber

"The Motor Cycle," of July 18, prints the following:

"Now that petrol is so rare and expensive could not correspondence be started upon the economy of machines? I possess a 1910 2 h.p. HUMBER lightweight, and I have often ridden in the past motoring days to Southampton from Coventry, and the last journey I made I had a strong wind behind me. I did this journey on half a gallon of petrol—a distance of 116 miles in six hours. Can anybody beat this for economy? I can generally do the journey on threequarters of a gallon even under adverse conditions."

W. J. STEVENS

Humber Limited, Coventry.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

1915 A.J.S., 3 speeds, complete, lamps, etc.; £41.—Cross, Effingham Sq., Rotherham. [X6873

A.J.S., 2¾h.p., 1916, not done 1,000 miles, as new; £50.—Dove's Garage, Bondgate, Darlington. [X6981

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

A.J.S.—Immediate delivery of Military Model. 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

A.J.S., 1915, 4h.p., and 1917 Norton sporting sidecar, only 4,000 miles, speedometer, tools, and spares; offers invited.—Attwood, High St., Stone, Staffs. [7366

A.J.S.—We have six 1915 and 1916 A.J.S. combinations from £75 to £110, all guaranteed; full particulars upon request.—Maudes', 100, Gt. Portland St., London, W.1. [7438

A.J.S., 1913-14, 2¾h.p., 2-speed, C.S. clutch, £35; 1914 3-speed and kick-starter, £42/10; 1914 6h.p. combination, £67/10; E.P. or exchange.—Service Co, 292, High Holborn, London. [7424

A.J.S., 2¾h.p., 1916, kick starter, 2 speeds, engine No. 5,169, all accessories, speedometer, new tyres; any expert examination; bargain, £41, no offers.—Lieut. Spowage, Hospital, Barton-on-Sea, New Milton, Hants. [7413

FORWARD FACTS No. 6.

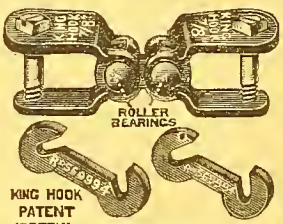
It's penny wise and pound foolish to go for cheapness in a fastener—

Look at the article, examine it minutely, and you'll realise that the difference between the cost of the best and the mediocre can only be "just pence."

Yet only "the best" will effectively guard against the roadside hold-up which *may* cost you pounds, and certainly *will* shatter your enjoyment of the trip.—

No, it's best to buy "the fastener that never fails"—the

FORWARD



The King Hook 1/-, adjustable 1/3.

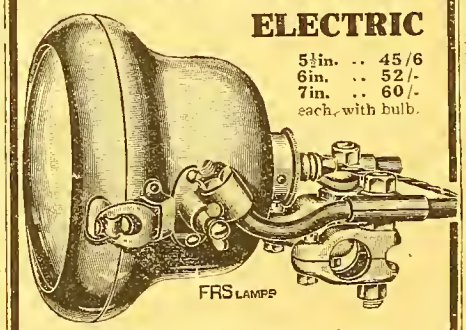
FORWARD MOTOR Co.
Forward Works,
Summer Row,
BIRMINGHAM.

1613.

F.R.S. LAMPS

ELECTRIC

5½in. .. 45/6
6in. .. 52/-
7in. .. 60/-
each, with bulb.



6in. and 7in. bulb and holder can be taken out while still lit and used for inspection lamp.

Set Lit from magneto, two lamps, 84/6.
Send for details.

F.R.S. LAMPS, "Beam" Works, Pershore Street, BIRMINGHAM.

ROSCO CYLINDER BLACK.

PRESERVES YOUR CYLINDERS.

Tins 6d. Tins 1/- Withstands Heat. Post Free, 8½d. Post Free, 1/3½

Sole Manufacturers:

OWEN BROS., HULL, Eng.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. 2¾h.p. Motor Cycle, 1914-15, 2 speeds, all chain drive, lamps, horn, new tyres; a bargain £52/10, or exchange for 6h.p. or 8h.p. combination.—Collinge, Plumber, Duke Bar, Burnley. [729

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Alldays.

1915 Alldays Allon, 2¾h.p., 2-speed, lamps; £25.—Elce and Co., 15-15, Bishopsgate Av., Cannon mile St., E.C.3. [648

Ariel.

CROW Bros., Guildford, Ariel agents.—New and over hauled second-hand models in stock. [5370

1915 5-6h.p. Ariel Twin Countershaft Combination, Lucas lamps, horn, mirror, grid, new Dunlop tyre and tube back, splendid condition; £55 cash, or consider 8h.p. combination, Matchless preferred, cash adjustment.—F. Devereux, Belle Vue, Shillington, Hitchin. [7351

Auto-Wheels.

AUTO-WHEEL, Wall, just overhauled, running A1, £8, or nearest—81, Long Lane, East Finchley, N.2. [7311

Bradbury.

BRADBURY 1913 4h.p. C.B. Combination, N.S.U. 2-speed gear and free, adjustable pulley, Amac, just been overhauled and renovated, in perfect condition throughout; bargain, £33.—Apply, Smith, Alexandra Rd., Walkden. [X7002

Brough

BROUGH Horizontally Opposed Overhead Valve Twin, 1914 Model H., 2 speeds, lamps, speedometer, etc., in A1 condition, a perfect solo mount; owner on active service; the highest offer gets it.—Box 2,175, c/o *The Motor Cycle*. [X6982

3½h.p. 1916¾ Brough, horizontal twin, Sturmey-Archer 3-speed countershaft, P. and H. lamps, Lucas horn, only run 15 months; 50 gns.; would exchange for Model D. Zenith-Gradua, not earlier 1916; private owner.—Box 2,174, c/o *The Motor Cycle*. [X6962

B.S.A.

B.S.A., new models H. and K. actually in stock; no permits required.—Moss, Wem. [X6875

B.S.A. Combination, 3½h.p., Bosch mag., condition as new; £33.—17, Toronto Rd., Ilford. [7321

B.S.A., 1914, 2 speeds, 2 lamps, generator, Dunlops, 2½in., as new; £26. 'Phone: Brixton 2407—110, Tulse Hill, Brixton. [7380

B.S.A., 3-speed countershaft, chain, kick, underslung coach sidecar, accessories; £48; offer, exchange.—24, Beauval Rd., East Dulwich. [7371

1915 B.S.A., Model K., excellent order, very smart appearance, lamps, mirror, Lucas horn, etc.; £40.—Pearce, Westonville, Great Missenden. [X6916

1917 B.S.A., 4½h.p., B.S.A. cancelet sidecar, 3-speed, clutch, kick starter, 3 Lucas lamps and horn; £75.—Wing, 72, West India Rd. Limehouse. [7316

1916 Model B.S.A., 4½h.p., 3-speed, free engine, kick starter, and Cancelet coachbuilt sidecar, smart and powerful machine, hardly used; £65.—Address, 28, Westville Rd., Thames Ditton. [7355

B.S.A. 4½h.p. Combination, No. 1 sidecar, Enfield spring handle-bars, electric lighting, chain drive, speedometer, 1917 condition; special bargain, run 3,000 miles; 70 gns.—Midgley, Cook Lane, Keighley. [X6919

THE MOTOR CYCLE
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Petrol for Soldiers—and Others.

OUR Correspondence columns have recently contained letters from soldiers who have found difficulty in obtaining petrol permits on returning home on leave from Overseas. It is generally known that soldiers on leave from hospital or from Overseas are allowed a grant of petrol for pleasure riding if they are registered owners of motor vehicles, or if there is a registered owner of a motor vehicle among their near relatives. Following on the recent concession to munition workers, it seems rather hard that Service men should sometimes be unable to procure that which others obtain without much difficulty.

The munition worker was in a position to present a united voice in support of his claims. By the very nature of his position the soldier is prevented from doing this, and any grievance from which he suffers has to be borne in silence.

It does not appear that the Petrol Controller has made any alteration in his principle of granting permits, but it would appear that a certain amount of slackness has been allowed in attending to applications from soldiers expecting leave. As most of us are aware, the date of a soldier's leave is not a factor over which he himself has supreme control; consequently it behoves anyone who wishes to benefit him during his period of leave to grant the means for the benefit as early as possible. In our advice to soldiers who ask us how they can obtain petrol we always say that application should be made to the Petrol Controller at least three weeks before the date of the anticipated leave. Where this is impossible we recommend that the soldier should write to the Petrol Controller, placing the full details of his case before that authority and stating his intention of calling personally when he arrives in Town. Thus, if a soldier writes one day and calls at the Petrol Controller's office two or three days later on he should stand a much better chance of obtaining a permit than if he relied simply on written application.

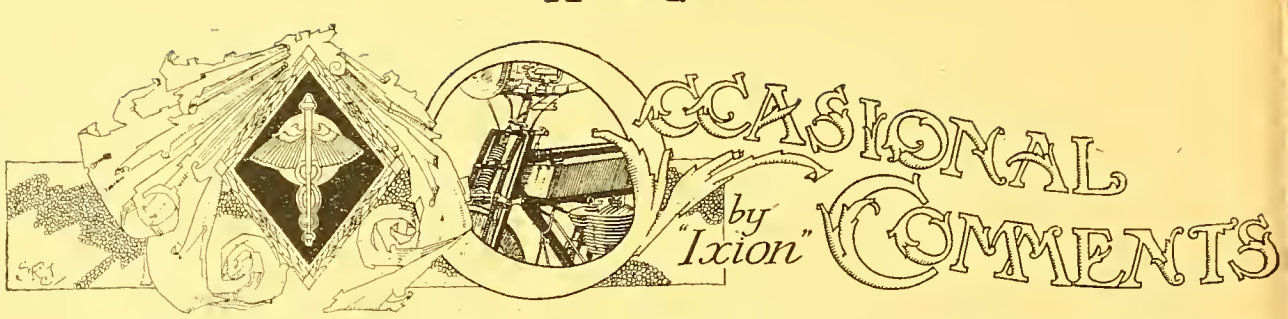
Fewer Parts.

ANYONE who has seen a Ford chassis must have been struck by the simplicity of its design, and if one happens to see a sidecar combination, *sans* body, at the same time it must be admitted that the manufacturer of the latter appears to be giving the most for the money. It would be interesting to see laid out the parts of a Ford and those of a twin sidecar combination, and, on the point of number, it is probable that the latter would be an easy first. When this is considered, together with the extra workmanship put into the motor cycle, it is not surprising that the American car is actually cheaper in the land of its birth than is the sidecar combination in either country.

Disregarding the enormous output of the Ford, it is a cheaper proposition to make than a sidecar combination, and if some manufacturer designed a sidecar machine on similar lines there appears no reason why a serviceable combination should not be produced to sell at a figure considerably less than the prices we shall be expected to pay when manufacturing for civil requirements is resumed. The whole question is one of design, which must consist of as few parts as possible, and these should be such that they can be made easily and cheaply.

A combined engine-gear unit with, say, a flywheel magneto is the first step; a pressed steel frame to eliminate the boring, turning, and brazing of innumerable lugs is another; a pressed steel sidecar chassis or one built of U section steel is a further point. One could not expect such things as spring frames, detachable wheels, and chain cases, but the class of buyer to whom such a machine would appeal would not expect these refinements any more than the buyer of a Ford car expects the luxuries only obtainable in a £300 car. It is a British trait that every manufacturer wants to turn out the best possible article, but there is a big market for a second best machine.

An index to the advertisements in this issue will be found on the page facing the back cover



Foot-operated Two-speed Gears.

SEVERAL correspondents kindly remind me that the B.S.A. two-speeders of 1912 and 1913 had pedal-operated gears of the type which I described as figuring on an experimental post-war machine. Our readers speak warmly of the easy gear change obtained with this type of control, and of the smooth way in which both high and low gear clutches took up the drive. The 1912 model was equipped with an Autoloc lever on the handle-bar, by means of which the pedal was supposed to be secured in "low" or "free" position, whilst it was self-locking in "top." Apparently this lever failed to act under the thrust of high r.p.m. on low gear, and an auxiliary trigger pedal replaced the Autoloc lever in 1913. Users agree that some method of locking the control pedal in all three positions is essential.

A Vacuum Aft of the Cylinder.

OUR contributor "Road Rider," in a recent article on improvements in air-cooling, asserted that an appreciable vacuum exists behind the cylinders of a motor cycle engine, as the rush of air is split on impact with the front of the cylinder, and the diverging currents do not rejoin until a point some distance behind the back of the cylinder. Thus a region of "dead air," or an actual vacuum, exists behind the cylinder, and, if the theory be true, the rear of the cylinder is much hotter than the front, and a tendency towards distortion is created. Nobody has challenged this theory, but a number of readers point out that the main air intake of the carburetter usually opens into this patch of dead air, or vacuum, as the case may be; and proceed to enquire how the carburetter ever inhales any air under such conditions. Some of them suggest that the elongated air intake pipes, for which there was such a craze a few years ago, owed their success to the fact that their business ends protruded beyond the vacuum.

Nothing in it.

I QUESTION whether the patch of dead air and the long or short intake pipe are interconnected. Take an extreme instance. The vacuum patch will be roughly V shaped at all road-speeds; at low road speeds, say 15 m.p.h., it will be a short, stumpy V, thus O>; at high road speeds it will be a long narrow V, thus O>. Therefore, so far as the protuberance of the air intake is concerned, the effect on carburetters will be most marked at high speeds. At a mile a minute on a windless day, the air stream passes the cylinder at a speed of approximately 5,280 feet per minute; but with a hot-stuff engine the mixture is racing through the carburetter at nearly double that speed, *e.g.*, 10,000 feet per minute. In other words, the forward suction at the air intake has a pretty good vantage over the backward currents of the atmosphere due to the speed of the bicycle. Furthermore, the vacuum itself exerts a strong forward suck: witness the assorted road matter which floats in over the rear of a car, and the draughts which the rear passengers feel raging down the backs of their necks. It would appear, then, that this patch of dead air interferes with cooling: but it remains to be proved that it impairs carburation.

Streamlined Fins.

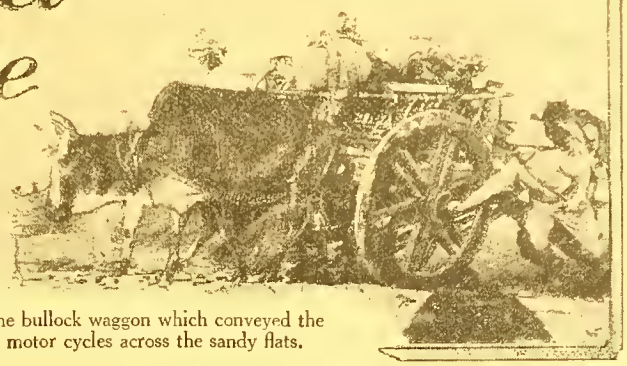
I SEE that "Road Rider" had a word to say in favour of streamlined radiating fins, tapered out eggwise behind the cylinder. Such fins would be a roundabout way of tackling the problem. They would not draw the air stream into the "dead" patch, but would take the heat out into the air stream, though their protruding edges would possibly shoot some minor eddies of air into the vacuum. It seems to me that a more efficient and certainly more presentable device would consist of a couple of baffle plates set at an angle to the track, and diverting the main air streams inwards to the back of the cylinder wall, thus ←O. The worst of it is that with our temperate climate, level roads, and eternal corners any old cooling system will do. Motor cycle manufacturers are therefore far less stressed, far less enquiring, and far less technically conscientious than the designers of aero engines. Still, the two-stroke still "bakes" its top piston ring into the groove, and thereby shrieks aloud for better cooling, and there are definite rewards for the motor cycle manufacturer who produces an engine which never gets tired and never pits its exhaust valve. Wherefore I live in hope. In the meantime, I should have loved to see those Alpine trials which the war scotched: I think they would almost have frightened a section of the trade into water-cooling.

Cooling and Valve Breakages.

OTHER correspondents suggest that if pre-war air-cooling systems were as crude as "Road Rider" suggests, broken valves would be a far commoner occurrence. Anybody who has ridden since 1906 knows that (1) inlet valves, which are automatically cooled, never break; (2) exhaust valves have given chronic trouble due to under-cooling, faults such as rapid scaling and pitting, as well as actual fractures; (3) only two firms could boast, even in 1914, that their engines never broke an exhaust valve. In other words, better cooling would mean that any old steel would do for exhaust valves, and that grinding in or refacing would become an end of the season job instead of a monthly affair.

A Thousand Mile Ride in India

FROM CALCUTTA TO AMBALA BY MOTOR CYCLE.



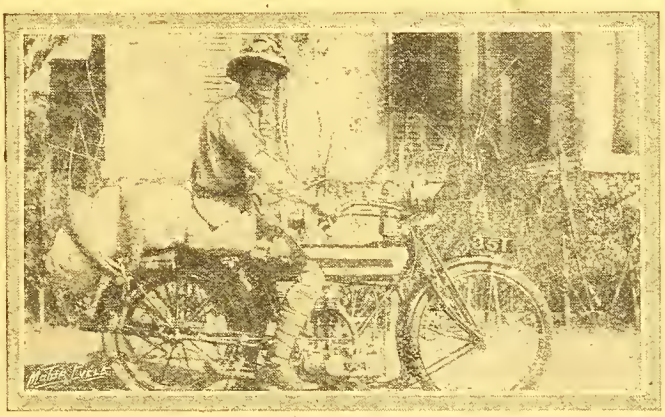
The bullock waggon which conveyed the motor cycles across the sandy flats.

HAVING with considerable difficulty obtained a month's leave from the munition factory in which we are employed, Sergt. —— and I decided to make the trip from Calcutta to Ambala (1,050 miles) by road. Sergt. —— possessed a 1912 Scott, and I a 1912 F.E. Triumph, and we accordingly spent a week or so tuning up the "irons." Several people whose experiences of India were much greater than ours, had many misgivings as to the successful termination of our scheme, but their well-meant attempts to damp our ardour were in vain.

An Accident and Some Luggage.

Leaving Calcutta at 8 a.m. one Sunday, we encountered misfortune surprisingly early. My chum's Scott is usually exceptionally steady in grease, but owing to the large amount of baggage on the carrier it developed a "tail wobble" which, combined with his over-confidence in the machine, resulted in a rather nasty skid hardly more than a mile from our start! However, in spite of the none too cheery outlook with our overloaded carriers, we returned to our bungalow and patched up the Scott's radiator, and incidentally Sergt. —— also (he had cut his knee and thigh rather nastily). The kits we each carried on our carriers consisted of a kitbag containing a two-gallon tin of petrol, one gallon of oil, spare tube, change of underclothing, two blankets, shaving tackle, and a tin of bully beef ("good old bully") and another of biscuits—our emergency ration. So it can easily be imagined that we had a nice little pile behind us with a spare cover artistically arranged over all.

At 11 a.m. we made another start amidst the cheers of our fellow munition workers, crossed the pontoon bridge over the river Hoogly at Howrah station, and soon got clear of the Calcutta traffic.



The writer of the article and the 1912 free-engine Triumph on which the journey was accomplished

We had an uninterrupted run until 2 p.m., when we were stopped with a leaky patch in my rear tube; that trouble cured, we ran on into Burdwan, arriving there about 3.30 p.m.

After a fill-up with petrol we pushed on to Asansol, having to light up thirteen miles before reaching there. Whilst riding behind the Scott in the dark I heard a rattle from my chum's machine, but thought no more of it as he didn't stop, but upon looking round the "irons" at Asansol we discovered the Scott's low gear chain had completely disappeared!

We found the "Dak" (or traveller's) bungalow and commandeered the only available "Charpoy" (bed); also got the "Khansamer" (cook) to wring the necks of a couple of chickens, which, together with potatoes and bread, formed our dinner.

Little delays the next morning, such as obtaining petrol, a flat tyre on the Triumph, breakfasting, etc., prevented our getting on the road till ten o'clock.

Coalfields and Hills.

We struck some very heavy going just out of Asansol, the road lying through the coalfields, and sections of it were inches deep in black dust. Once clear of the coalfields the road was excellent for about twenty miles, when the surface became very loose with a soft earthy covering.

That day we encountered the hilliest portion of the journey, and I must say it made a welcome change from the flat riding which prevails in India generally.

However, no hills were steeper than about 1 in 12, and as practically all our riding at home has been done in Devonshire, we hardly spoke of them as hills. I happened to get ahead of my chum, and, not seeing anything of him on the horizon, I pulled up and did a bit of waiting. Half an hour slipped by without signs

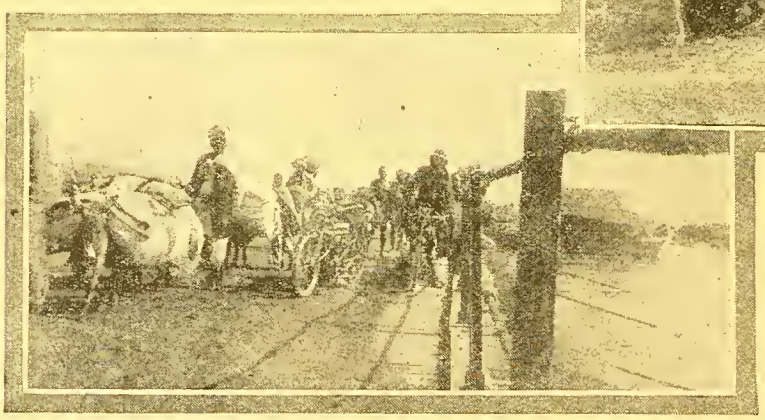
A Thousand Mile Ride in India.—

of the "purring Scott," so I set off back to pick up the pieces, and after five miles discovered the missing one, with all his kit unpacked and gracefully arranged around him, and the rear wheel out, fitting a new tube! The butt on the old tube had given up the ghost.

We stayed the night at Burhi, only a small village, and put up in the Dak bungalow, although we were unable to obtain any bread, tea, or butter, but got the inevitable fowls, together with potatoes and native "Chappatties" (unleavened bread in the form of pancakes).

During our look round the machines we discovered my chum's magneto spindle was rather stiff, so decided to investigate, and accordingly dug out the magneto from its bed of dust, mud, and grease. We found the shellac from the armature winding had artistically transplanted itself on to the pole pieces and practically seized up the armature solid. It must have been extremely warm, but I have known the same thing to occur a number of times out here on all types of magneto, and have heard of similar trouble in other tropical climates.

The next day we were away by 8 a.m., and, the Scott travelling better to-day, we made good progress to Dehri-on-Sone, which we reached by twelve noon. On the way to Dehri I had rather an interesting diversion; upon swinging round a corner, I came face to face with an elephant on a narrow bridge! The brute seemed to resent the noise of the engine, so I deemed discretion the better part of valour, as the animal started to trumpet and gambol about too much for my liking, and I pushed my machine into a native hut till the old "Mahout" had manœuvred the beast past. I traced its footprints on the Grand Trunk Road for twenty-three miles!



The bridge of boats at Allahabad

Indian Cattle.

The cattle we met on the road caused great amusement; they would stare with intense surprise until we reached them, and then snort with anger and dash after us "all out," and it is a really comical sight to see a huge water buffalo "at speed." I wondered at times what the result would be if the old Triumph "petered" out during one of those chases, but it never did.

It is a good maxim when passing a bullock cart to keep as clear as possible: the animals shy backwards at the very last moment, and round comes the long tail of the cart, effectually blocking the whole road. At Dehri we had the Sone River to cross, which is over three miles wide. We were building great hopes that we would be able to cross on the railway bridge, but upon investigation we discovered it was impossible from a practical point of view, as the bridge was built of channel steel girders U section, so we had to cast around for other means of crossing.

Crossing a River Three Miles Wide.

Straining our knowledge of Hindustani to its limits, we chartered a bullock cart from a village close by, and, after tackling a portion of our emergency ration, we loaded up the machines and started across. The first portion of the river bed was sand for half a mile, and then the cart had to make a long *détour* whilst we took a boat and were ferried at a part where the

Tyre trouble on the journey

stone causeway (which, by the way, extended across the whole river bed) was broken away; then came some wading for a mile or so, the water being two feet deep and very swift as the causeway was sloping. We each had the assistance of a coolie, as the stones were covered with green slime, and a false step would probably have sent us into deep water the other side of the causeway.

However, we managed it all right, watching the bicycles in the cart about threequarters of a mile away with the water lapping the floor of the vehicle! It would have been "good-bye" to them if the cart had met any pits in the river bed. We next had another mile or so of deep sand, very heavy going for the bullocks. Here we noticed a gang of natives digging out the causeway, which had been buried in about 6ft. of sand washed down during the monsoons. It was 5.30 p.m. by the time we had unloaded the machines, and a "Dak" bungalow being handy, we decided to stop the night. The following morning, as we were in need of petrol, we walked two miles to a P.W.D. workshop, but had no luck, and finally had to purchase kerosene. My chum had some difficulty in starting his Scott, but the Triumph took it all right. We made fairly decent progress, barring starting troubles with the Scott, and called in at Moghalserai Station for a "feed" about midday, finally crossing the Ganges by the railway bridge into Benares.

A Thousand Mile Ride in India.—

The Scott ran out of fuel just outside the city, which compelled me to ride about four miles into the "holy city of the Hindoos" in search of the precious "juice"; I managed to obtain some, although I had a lively time in the crowded streets, which were full of bullocks, "Ekhas," etc. This was the first supply of spirit we had been able to obtain since leaving Asansol, a distance of nearly 300 miles! Once again on the road, we ran for five miles past Benares City to the Cantonment, and encountered a heavy rain-storm, so decided to spend the night at the Dak bungalow, it being 5.30 p.m. The following morning dawned "merry and bright," though the roads looked a bit greasy with the rain of the previous night. Arriving in Allahabad at midday, we satisfied the "inner man" at the station, filled up with spirit in the Cantonment, and got on the road for Cawnpore, which is 124 miles away.

(1) A bridge typical of many that span the Indian rivers.
(2) A well-loaded Scott, ridden by the writer's companion
(3) Crossing the River Gom.

Nightfall found us forty miles from Cawnpore, so we "hove to" and located a very tiny P.W.D. bungalow. The building had only one small room, and by the time both machines were inside and the kit bags unpacked there was not much room for dancing! No food being available, we tackled the emergency ration once again, after which repast we "spun the coin" for the only "Charpoy" available and "turned in," my chum on the floor and I ("the lucky beggar") on the bed. We spent rather a cold night, the room being ventilated by two large round holes high up in the walls, and, after a cigarette as a substitute for "Chora-Hazri" the next morning, we ate up the forty miles into Cawnpore, and during the next two days completed the whole of the journey.

Roads and Machines.

On the whole, the Grand Trunk Road is good, but there were some very rotten stretches, particularly after leaving Cawnpore, the surface having apparently been attended to about ten years ago. Twenty-eight inch wheels are really necessary for general running out here, as some parts of even the G.T. Road are deeply rutted. Except for my magneto trouble I never had occasion to use my tools, not even to remove the plug, whilst the belt fastener I fitted at the start was not unscrewed from the belt. Needless to say, the machines were simply caked in dust and oil at the conclusion of the ride, and each district had deposited a different coloured dust—black, white, grey, red, and yellow. The old Scott averaged fifty-five miles per gallon, and my Triumph seventy, which quite satisfied us, considering the conditions.

Various Incidents of the Trip.

Of course, to relate every incident we experienced on the road would occupy too much space, but they were many and varied. Just outside Cawnpore the Scott was flying on in front of me, and had just passed a large bullock cart loaded with grain; the animals shied violently, and when I "hopped" past the grain had shifted to the rear and lifted both bullocks in the air by their necks! I imagined from the attitude and gesticulations of the driver that he was calling the curses of his gods on everything motorish.

The manner in which one is received by the villagers in the country differs greatly. In most places the natives were very respectful, in some cases grovelling on the ground whilst we passed, but there were also villages we passed through at which I should not have cared to stop. The children showed their evident dislike of a European by spitting, and in one instance a large stone (about the size of a brick) was thrown into the road just in front of me, which resulted in a dented rim; of course, it was useless to stop and lecture the culprit, especially as the village was crowded with evil-looking natives. The P.W.D. (Public Works Department) bungalows, at which we spent most of our nights on the road, are really intended for the use of inspectors when on a tour of the district, but *bonâ fide* travellers are entitled to use them.

THOS. COWELL (Sgt.)

INTERNALS OR EXTERNALS?

Which is the More Important from the Buyer's Point of View—

Internal Workmanship de Luxe or External Fittings?

THERE is one aspect of post-war possibilities that has often occurred to me, but which I have not seen seriously handled elsewhere, and that is, the relative importance, from the selling point of view, of the internal construction and the general external appearance of a motor cycle. Assuming a certain satisfactory standard, which pays better for further development—workmanship on invisible internals or the elaboration of visible externals? In other words, if you are offered one of two machines, and you are able to take the reliability and general service of both of them as quite satisfactory up to, we will say, 15,000 miles running, which will influence you more in deciding on one of the machines in preference to the other—the knowledge that one, A, has most magnificently machined roller bearing connecting rods, patent piston and valves of a wonderful steel, or that the other machine, B, is equipped with dynamo lighting, oversize tyres, a specially comfortable saddle, and perhaps specially large filler caps for the petrol tank?

The Cost Element.

To get a satisfactory machine will necessitate an outlay of, say, £45. To buy a machine may necessitate £60. Would you rather have that extra £15 spent on extra finish inside the engine and frame details, or would you rather have it in extra gadgets—useful gadgets, of course?

The answer to this question is one of interest to a manufacturer in considering his post-war programme, and it might be as well if the attention of the potential buyer were called to the significance of the two points of view.

Let us see what is meant by each of the extra features we are considering. Elaborate attention to the internal workmanship will mean perhaps an extra five or six miles an hour, assuming that the engines of the two machines are of approximately the same size: it will mean smoother running; possibly it will incidentally involve better balance; and it will also give you that pardonable pride which comes from owning a machine which is generally admitted to be the very best in every respect. If you are swayed by the other attraction, you will smile when you hear that the purchaser of the first machine has been dipping his hand into his pocket for at least a fortnight after his original purchase, in order to obtain accessories that you received with your machine in the first instance, and when he has them they will not look so neatly arranged or so suitable as those you purchased on your machine all complete. When you get the opportunity you may take your new machine and ride it over a hundred miles without any hesitation or deliberation at all; and while you have to drive carefully because your engine is not so perfectly finished, you will have, as compensation, the knowledge that you have obtained a clear week's or fortnight's riding more than the other man, who has not been able to take a serious run because accessories, such as speedometer, lamps, etc., that he ordered have not arrived.

Tyres.

Also, tyres are certainly an external, but they are most important, and when it comes to a bad bit of road you will certainly be thankful that some of the superfluous £15 has been spent, in your case, on providing extra road comfort. True the other man will pass you when it comes to a blind on good roads, but on a long run of perhaps a hundred miles, how much road will be found good enough for a blind? And the probability is that after a month's riding, when both machines are fairly run in, you will leave the other man simply because the comfort of your riding position enables you to maintain a higher average speed than he is able to hope for on a long run.

A rather interesting commentary on this question was afforded recently when I, in company with my colleagues, saw the first photographs and description of the new Raleigh flat twin. Nearly every man in the office commented first on its generally neat and attractive appearance. It was only after we had exhausted our praise of the obvious that we turned to criticise its mechanical features, and I think this fact speaks volumes. We all appreciate fine workmanship, and most of us consider ourselves competent to pass some sort of opinion on an engineering achievement. Nevertheless, more than one said that if the machine were marketable and riding were possible, it was a machine he would very much like to own, and his opinion was unquestionably due to the attractive appearance of the *tout ensemble*.

Elaborate Finish.

I like fine workmanship myself, and when I see a beautifully machined steel or aluminium piston, and a cylinder of which the outside is only a shade rougher than the inside, I am as full of praises as anyone. On the other hand, when it comes to parting with my cash to buy a machine that I want to carry me everywhere throughout a season, I am far more likely to think, after all, what does the extra polish on the cylinders mean to me during a season's riding com-

Internals or Externals? —

pared to the advantage of a useful accessory neatly and securely fitted?

A machine I was looking at the other day had cylinders the outside of which, it is to be hoped, were considerably rougher than the inside. On the other hand, for ordinary work the outside polish of a cylinder is not a great asset. Ball bearing mainshafts are quite satisfactory, and while not so good, perhaps, from a theoretical point of view, as roller bearings, are not likely to make the difference felt in practice until more miles have been covered than are likely to come within the experience of one or even two seasons, and then—and this is the question—for the same outlay I am offered in the one case a motor cycle and nothing more; whereas in the other I am offered a motor cycle ready for the road, with all accessories, of very pleasing lines, substantial enamel and plating —not much of the latter, fortunately—good size tyres, and all other features that are likely to catch a critical glimpse. Personally, I am going to plump for the machine with the equipment and the pleasing externals, rather than that of the Rolls-Royce internal finish.

It should be clearly understood that I am referring in these notes to the choice of the ordinary rider of the ordinary machine for ordinary purposes. When it is a case of the racing man or the machine for a particularly strenuous six days' trial there is no doubt that the foregoing remarks need some qualification, and the machine of super finish is then the one on which to put your money. But the average rider does not "race"—although he may be offended if you tell him this—and ordinary riding is not half so exacting as a six days' trial in spite of what the "all-weather" merchants may say to the contrary. Obviously if you are intending to submit your machine to abnormal wear it must be made of abnormal materials.

RAMA.

TANKS IN ACTION.

"Over the trenches goes the Tank—and away she crashes and stumbles, dealing destruction."

THE extract below is from the *Daily Mail*, and describes in a vivid manner the work of thousands of the men who were recruited by *The Motor Cycle*, and who were before the war enthusiastic motor cyclists:

They stand there silent and grim, and everything around is still. The coming dawn wreathes them in shadow in which evil seems to lurk. The crew can be seen nowhere —they are hidden in the Tank, and there they will get some rest before the great day in front of them.

Suddenly the crew wake up. They give the engine a turn. Will it go? No! "Trip your mag," says one; and soon the monster is throbbing with life—a minute before zero [the hour at which the operation is timed to begin].

Then begins the thunder of the barrage—the finest cure for a weak heart there ever was. It makes a man feel as fit and as fresh as a lark—it excites him, and he forgets the risks.

Away swings the Tank, gathering speed as fast as the spreading dawn lights up the way before it. *The fight has begun.*

Already the bullets are spattering against its thick hide, already the sparks are flying inside, but the engine is warming to its work, and the crew are standing to their guns and waiting for the first sight of the Huns. The Tank's gun begins to bark against the *splutter, splutter* of the machine guns, the little shells whizzing with horrible accuracy into the midst of the enemy's picked gunners and leaving a tangled mass of men and metal. The Tank crosses their wire, the tin cans rattle, the iron stakes snap, and slowly and surely a path is made.

Then comes *the* great moment of a battle, the moment of hesitation before one side gains the mastery: when the attackers lose heart or when the defenders collapse and break and run from the certain death in front to the cruel barrage behind. But up swarm our infantry—up with a roar.

Over the trenches goes the Tank, up goes the nose, up high, and then over—over the enemy, perhaps—and then down comes the keel, and away she crashes and stumbles, dealing destruction.

* * * * * *

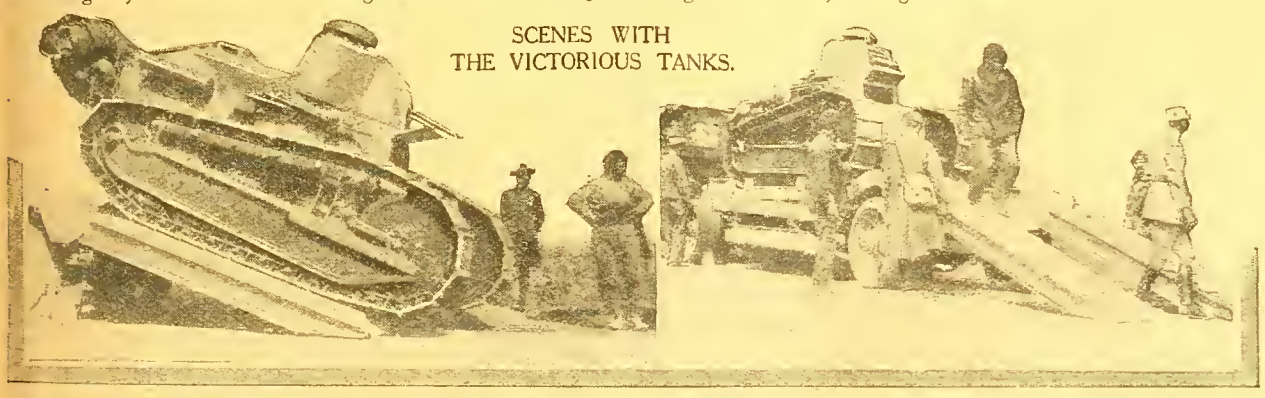
It is ditched!

"Unditching gear," is the cry. And at once out dash the two men whose job it is to fix it. They care not for the risk, they forget the artillery, they heed not the bullets, and soon the Tank is free of Flanders mud once more.

But where are the infantry? Gone! "Where am I?" and "How's the petrol?" the Tank commander asks himself. He examines the map—it tells lies everywhere. A smoking heap of ruins is the farm called "Four Huns Farm." And the woods—where are they? "Sixteen gallons left, sir, and the radiator's got a bullet through it, I believe!"

There is no choice, he must get back and refill; and yet he wonders if his Tank is wanted away where the noise of battle is yet to be heard, though more faintly. But, swinging to starboard, he begins to return.

SCENES WITH THE VICTORIOUS TANKS.



The new Tanks played a very prominent and successful part in the recent offensive, and the photographs illustrate the methods used by our French Allies in transporting Tanks to the scene of operations Very heavy trolleys are used for this work.

CURRENT HAT

Times to Light Lamps.

SUMMER TIME.

Aug.	22nd	... ...	8.39 p.m.
,,	24th	.. ...	8.34 ,,
,,	26th	... ...	8.30 ,,
,,	28th	.. ...	8.26 ,,

Alignment.

Sidecars leaning at all angles were out during the munition workers' holiday. Line them up, gentlemen, for the next holiday.

Why?

At certain fashionable resorts it is still possible to see Rolls-Royce and other high-powered cars driven by ladies running about on business of their own instead of the nation's.

Congratulations.

C. B. Franklin, the Irish exponent on Indians, has been elected a member of the American Society of Automotive Engineers. Franklin now holds an important position at the Hendee factory at Springfield, Mass.

Hope.

We are advised by the repairs manager of a well-known motor cycle concern that a victory on the Western Front is invariably followed by an increase of orders for spare parts for machines which have been laid up for the "duration."

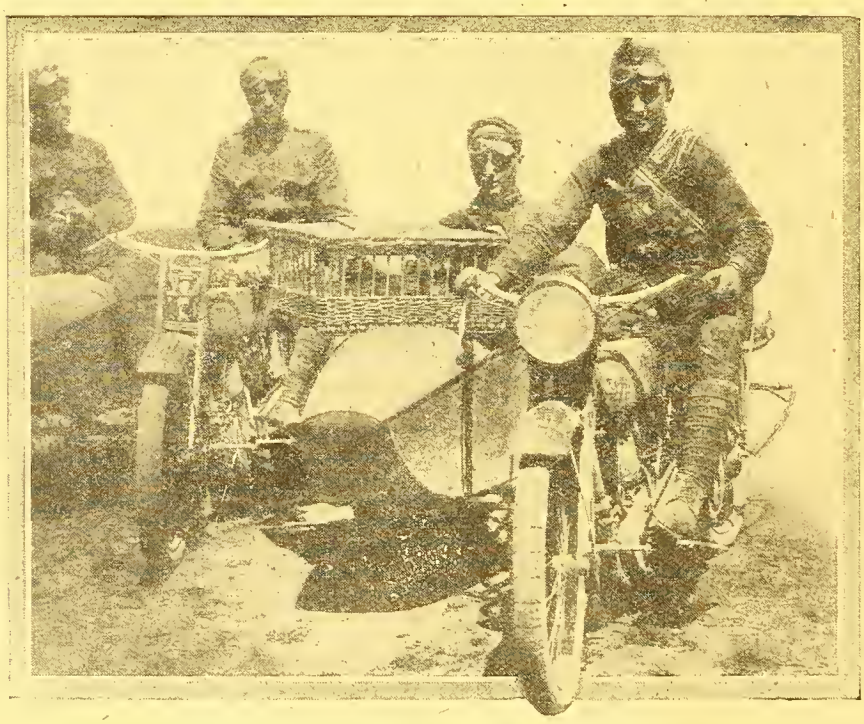
A Petrol Licence Anomaly.

A correspondent recently applied for a petrol licence for the purchase of petrol so that he might keep tuned up his motor cycle which he used when on duty as a "special." He received an allowance of two gallons per month, and shortly afterwards supplementary licences for another five gallons (one gallon per month).

Taxes.

The post-war motor cyclist will be asked to contribute more than his share towards the cost of the war. There will be a tax on his machine, on his petrol, and the annual tax. Does this spell great popularity for the cheap, economical lightweight?

Said President Wilson anent taxes and the people: "We need not be afraid to tax them if we lay taxes justly."



WITH THE AMERICAN ARMY IN FRANCE

Carrier pigeons for despatch work being delivered to an American front in Lorraine by U.S. Signal Corps motor cyclists.

Special Features.

INTERNALS OR EXTERNALS?

A THOUSAND MILE RIDE IN INDIA.

THE AERO-MOTOCYCLETTE

Handbooks on Motor Cycle Matters.

A complete list of publications useful to motor cyclists and car owners is ready, and will be sent post free on application to Messrs. Iliffe and Sons Ltd., 20, Tudor Street, London, E.C.4.

The Coventry Motor Club's Sweepstake.

At the start of the war the Coventry Motor Club Committee had a sweepstake on the duration of the war. (By the way, it is so long ago that some of the committee have forgotten who holds the stakes.) Anyway, the estimates varied from three months to between three and five years. Those who said over three years were regarded at the time as "pannicky."

Mudguards.

"Red Cap" in *The Irish Cyclist and Motor Cyclist* suggests to designers that they try designing a motor cycle around a pair of mudguards, which he maintains should be from a foot to eighteen inches wide. As our Irish contemporary points out, mudguards usually are the last things to be considered, and by the time the mudguarding problem comes along the designer has limited himself by other points of design.

Motor Cyclists Wanted.

Motor cyclists using sidecar combinations are required for night transport work in London by the A.S.C., M.T., Volunteers, late County of Middlesex Motor Volunteer Corps. Those who join up are only expected to do one night's duty monthly. Petrol is supplied free; the work is both enjoyable and useful. Application should be made to Major Curtis, Market Chambers, Church Street, Enfield.

Reafforestation.

The magnitude of the reafforestation schemes of the Government is revealed in recently published figures. It is proposed that 200,000 acres be planted at once, and that ultimately nearly two million acres be afforested. Reafforestation has nothing to do with the motor cycle, but it has a great deal to do with the pleasures of the motor cyclist of the future. If Great Britain had no trees it would be robbed of its beauty, and motor cycling would lose half its pleasure.

"Winged Warfare."

This interesting book by Major Bishop, V.C., R.A.F., referred to by our contributor "X.Y.Z.," may be obtained from the publishers of *The Motor Cycle*, price 6s. 6d.

The Industrial Reconstruction Council.

The report of the I.R.C.'s work for the last six months has just been issued, and forms interesting and illuminating reading. Copies may be had on application to the secretary at 2 and 4, Tudor Street, E.C.4.

The Motor Cycle Boat.

Why does not some designer make a really serious effort in this direction? We have described one or two attempts, but the really successful effort has yet to materialise. And think of the possibilities!

Spring Frames.

Among the most enthusiastic supporters of our spring frame campaign are the testers of W.D. machines. Their experience on war time roads makes them most emphatic on this point. Spring frames must come.

Interest in Cycle Cars.

The number of enquiries brought by every announcement we publish of any cycle car shows that interest in this type of vehicle—the really light motor cycle type of three- or four-wheeler—is continually on the increase.

Waste of Petrol.

In supporting the application of the district nurse for petrol for her motor cycle, the chairman of the Harrow Council said "the nurse was showing considerable public spirit in making use of a motor cycle for the better discharge of her duties. The gallon or two of petrol that she would use would not be missed when they considered that men in the Army used petrol to wash their hands in and for very unnecessary purposes."

The Luxury Tax and Motor Vehicles.

When the Select Committee on Luxury Duty was appointed the Automobile Association immediately took steps to prevent, if possible, the inclusion of motor vehicles as luxuries. A vigorous protest was lodged with the Select Committee on the ground that luxury motoring does not exist, and that the only vehicles now employed are engaged for urgent household requirements, professional purposes, or in connection with national work, voluntary or otherwise. It was urged that the tax would cause unmerited hardship, and increase considerably the already very heavy burden of taxation now borne by motorists. These arguments were impressed upon 230 members of the House of Commons, who are also members of the Automobile Association. Many replies were received promising support of the Association's views when the matter comes before Parliament. In response to the Association's request, the Select Committee invited representatives to attend a meeting of the special sub-committee dealing with motor vehicles. The case for motoring, as already submitted in writing, was thoroughly discussed, and the arguments against the present day motor car being treated as a luxury were resolutely upheld.

Egoist or Egotist?

The man who thinks he knows more about a motor cycle than you do is as great an egoist as you are for thinking he does not.

Windscreens.

A windscreen on a motor cycle is not altogether out of the range of practicability. We have seen a design recently which should be quite serviceable. It was designed by a lady.

Nuts, Bolts, and Screws.

An East End works manager, when pulled up by the police, produced a handful of nuts and bolts and explained he was using his sidecar outfit to take them to a prospective trade customer with whom he expected to do business. The magistrate afterwards put the screw on to the extent of £20.

A D.R. Scribe Wanted.

Every branch of the service has its scribes and bards. There are dozens of books published concerning the work of the Infantry, Artillery, Air Service, Ambulance Corps, Submarine Chasers, Destroyers, etc., etc., but the D.R. has not yet been eulogised as he deserves. The Motor Machine Guns, the Armoured Cars, and the Tanks, too, have not yet produced a scribe.

Frame Sizes.

Short motor cyclists tell us they want lower frames. Tall riders grumble that all motor cycles are designed for the short rider. As a matter of fact, frames are never designed with considerations connected with the men who are to ride them, but generally they are made as small as is possible to accommodate the engine and gear box.

Yachtsmen?

Quite a number of ex-motor cyclists are serving in the Navy, the motor boat patrol, and submarine chasers. Will these pseudo sailors return to the world of wheels, or will they hoist a flag on a motor boat on the local river or canal?

Finish.

Recently we were invited to inspect a twin combination which has been overhauled and painted by its owner in his spare time. The paintwork of both machine and sidecar was white. The combination looked remarkably well, and on our expressing doubts concerning the durability of the "colour," the amateur craftsman advised us that prior to the war he used a white car, which, he said, showed the dust and dirt less than dark colours or even buff.

A Good Tank Story.

The Australians had some difficulty in capturing the village of Marcelcave on the first day of the recent offensive. The village was strongly defended by machine guns, so a Tank was sent on to deal with these. It did its work so efficiently that there was nothing left for the infantry to do. The Tank then formally handed over the village to the Australians, and the C.O.'s of the two companies concerned gave the Tank Commander a full receipt: "Item, received on August 8th from Commander ——, Tank No. ——, one village of Marcelcave, in indifferent repair."

The Very Simple Cycle Car.

We recently saw an excellent example of what can be done in this direction. It was a four-wheeler, the near side rear wheel only being driven by means of a belt from a countershaft, which in turn was driven by a chain from a Sturmey-Archer three-speed motor cycle gear box, driven in its turn by a chain from the engine—an ordinary 3½ h.p. motor cycle engine now nine years old! The kick-starter of the gear box had been replaced by a handle, which started the engine on being pulled up from the driver's seat, something similar in its action to the starter on the Hun Brennabor car.

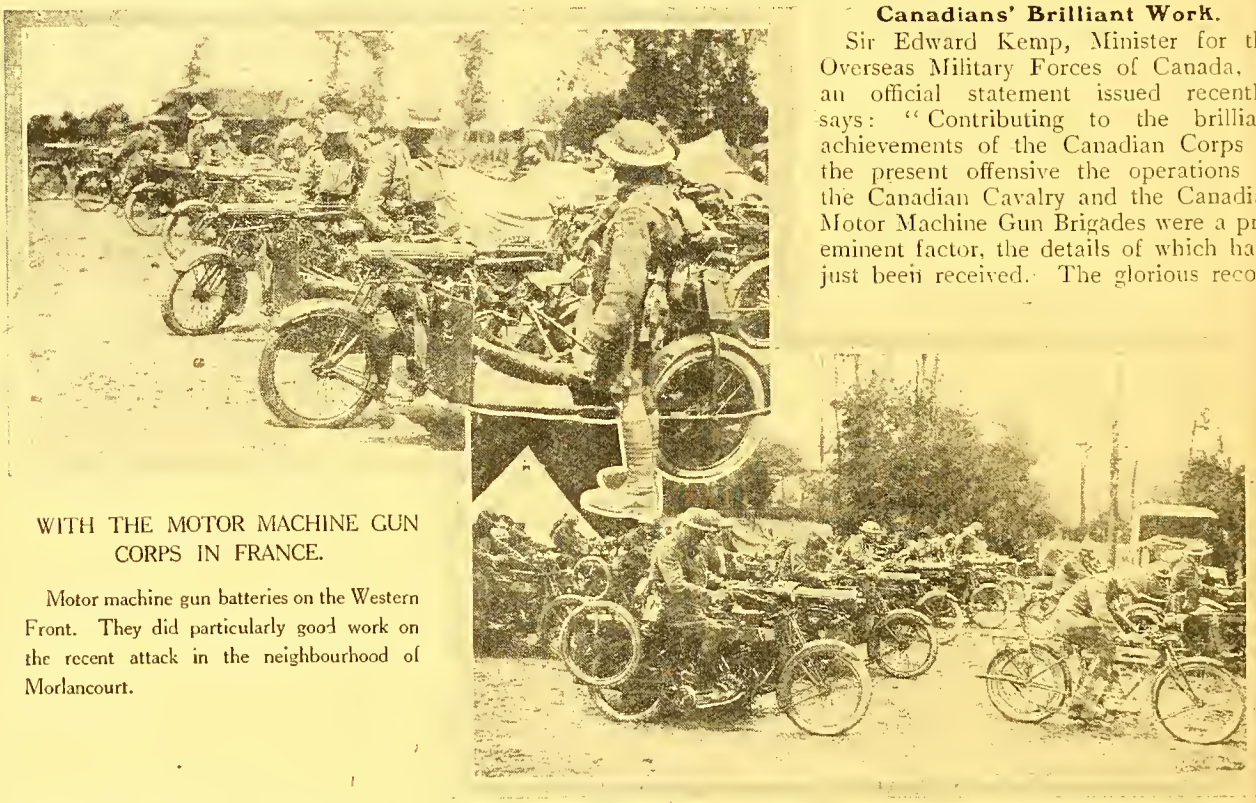
The owner and maker was, when we saw him, on his return from a holiday trip in Wales, where his little two-seater had carried him and a lady passenger without a falter, climbing all hills with ease on second gear, and averaging over 20 m.p.h.

A Harley-Davidson outfit used by a truly enthusiastic sidecarist.

Motor Machine Gun Batteries in France.

GOOD WORK IN RECENT ATTACKS.

"AT an early hour our first objectives had been reached on the whole front of attack. During the morning the advance of the Allied infantry continued, actively assisted by British cavalry, light tanks, and motor machine gun batteries." So ran the despatch issued from the British General Headquarters at 8.35 on the morning of the Allies' recent advance at Branches to the neighbourhood of Morlancourt. To a great many people the use of the motor machine gun batteries on the battle front of France came as a surprise. It was thought that their use in this war had been quite negligible, and that the majority of the 10,000 men recruited by *The Motor Cycle* for the Motor Machine Gun Corps had been transferred to the Tanks. Far from that being the case, the M.M.G.C. has been well in evidence on several fronts. In the issue of June 27th we published a photograph of a battery operating in Italy, which performed excellent work recently on that Front.



WITH THE MOTOR MACHINE GUN CORPS IN FRANCE.

Motor machine gun batteries on the Western Front. They did particularly good work on the recent attack in the neighbourhood of Morlancourt.

A clear account of the work of the M.M.G.C. in the attack in France has yet to be told. The *Temps*, however, gives a description of the part it played, which would show that the men of the M.M.G.C. have reason to be proud of their recent achievements. The writer says: "The arm which is not a new one but which up to the present has not had the opportunity of especially distinguishing itself—the motor machine gun—made its appearance on August 8th (the date of the attack). The wonderful achievements accomplished by it are legion, and are remarkable for their diversity. Germans of all ranks and all arms have had a painful lesson from it. Sent forward at top speed well in front of the troops, these vehicles of strange form dare everything, sowing fear and death in the ranks of the enemy before the Germans know what to make of this new adversary."

It will be interesting to hear from the drivers themselves the true version of their adventures. But it is sufficient to know that the Clyno motor machine gun sidecars, together with the Whippet Tanks, have justified themselves, playing a valorous part in an attack which later on may be looked upon as one of the most significant of the war.

Canadians' Brilliant Work.

Sir Edward Kemp, Minister for the Overseas Military Forces of Canada, in an official statement issued recently, says: "Contributing to the brilliant achievements of the Canadian Corps in the present offensive the operations of the Canadian Cavalry and the Canadian Motor Machine Gun Brigades were a pre-eminent factor, the details of which have just been received. The glorious record of these units is vividly described in the despatch from Mr. Roland Hill, official correspondent with the Canadian Forces in the field."

The following are extracts from the despatch referred to:

"The Canadian Cavalry and the Canadian Motor Machine Gun Brigades played their own brilliant part in the victory.

"The Motor Machine Gun Brigade flanked our cavalry and kept the Boche on the right from rallying. The same old armoured cars that helped to save Amiens were here on the same roads again. They dashed up side roads and enfiladed the enemy as he tried to dig new machine gun posts and they disgorged crews at every vantage point who made little nests of their own and caught the Boche as he went over the sky-line."

THE MOTOR CYCLE

AVIATION SECTION

Transferred Officers and their Rank Badges. Hun Tails Down.

Greek Aerial Mail.

An aerial mail service is to be inaugurated between Athens and Salonica.

—◇⊡◇—

All Cheery.

The Army generally—quite apart from the R.A.F.—have very much got their "tails up" just now.

—◇⊡◇—

An American Comparison.

Query: Was the American Aircraft Minister's comparison of the Liberty engine with "our" best quite "the thing?" The end of the war will decide.

—◇⊡◇—

Financial Booms and Smashes.

Those people who have been asking why Frankfort, the great financial centre of Germany, was allowed to escape bombardment will be satisfied in knowing that last week the R.A.F. Independent Force in France successfully bombed the chemical and aeroplane works in that city.

—◇⊡◇—

Transfer of Officers to R.A.F.

The names are published of officers in the Departments of Aircraft Production who are now transferred or attached to the R.A.F. This list will soon be followed by a similar one for officers of the A.I.D.

Officers transferred to the R.A.F. from the Navy or Army and who received a higher rank are cautioned against wearing their new insignia on their old uniforms.

France to Berlin.

What are the chances of a Transatlantic flight this year, and, if it is to be, why not start *from France* and get to Berlin?

—◇⊡◇—

Lt. Lowenhardt Shot Down.

Lt. Löwenhardt, who had fifty victims to his credit, was shot through the heart by a British airman while leading Richthofen's old "circus" in a fight over the Somme.

—◇⊡◇—

Another Long Flight.

An ordinary British Service four-seater machine has flown from England to Egypt to schedule time, a distance of 2,000 miles, with only two halts for petrol, etc. As this is a piece of routine work of an ordinary R.A.F. machine it is full of promise for the post-war development of British aviation.

—◇⊡◇—

A Hun Admission.

A German communication says: "All regiments have repeatedly complained that low-flying enemy aeroplanes are not interfered with by our fighting machines. Our resources in aircraft are so low, and those available are so busily engaged on reconnaissance work, that we cannot also be expected to engage enemy machines carrying out low reconnaissances over our lines. The infantry must arrange for its own defence against enemy aircraft to a greater extent."

Armoured Planes.

The Huns are said to be using armoured planes, *i.e.*, fuselages protected by a coating of steel. When they do "crash," it is some nose dive.

—◇⊡◇—

Aircraft Production in Germany.

Is it true that the Germans are suffering from a general shortage of material for aircraft production, particularly woodwork of the right kind?

—◇⊡◇—

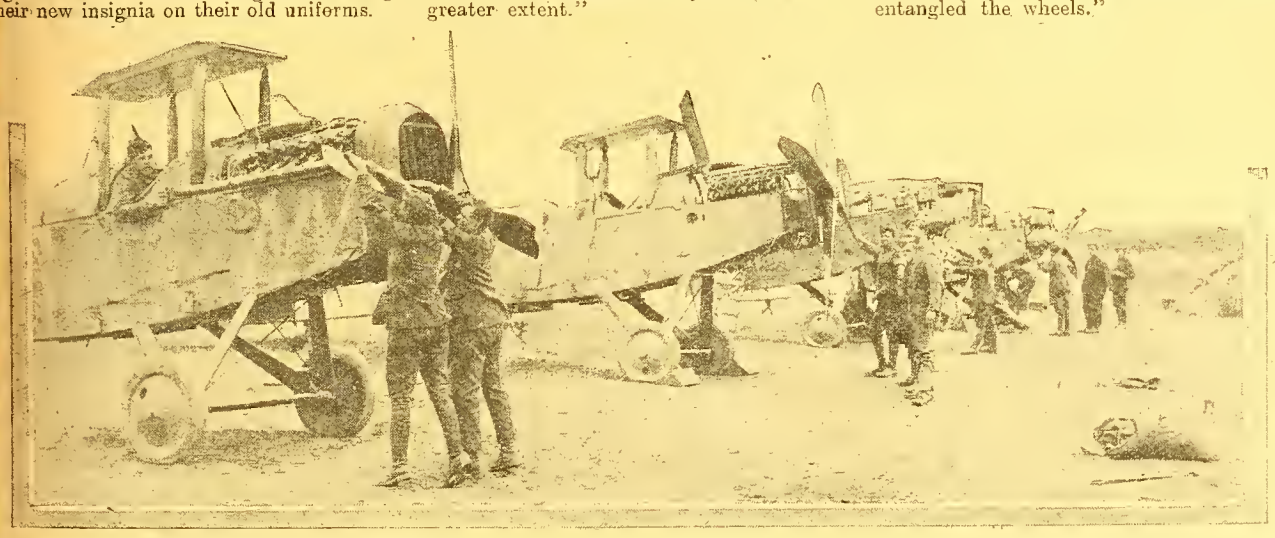
Once More—The R.A.F. Uniform.

It is to be hoped that there will be no further changes or orders issued in connection with the uniform of R.A.F. officers. Khaki will be retained after all, but what will the score or so do who dared to venture into light blue? Some papers are asking what the autumn fashion will be.

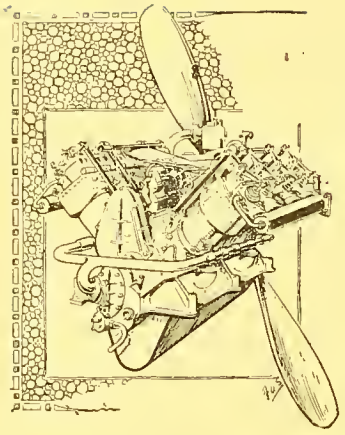
—◇⊡◇—

Landing in a Cornfield.

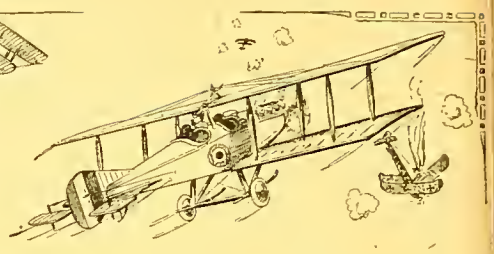
A correspondent writes: "With regard to 'Landing in a Cornfield,' a few weeks ago I saw such a landing in the South. Apparently it was involuntary, and due to engine trouble. The result was that the plane ran along a few yards, and then upended. The pilot got out, apparently uninjured, but the plane had to be taken away on trolleys. I was not close, but it occurred to me that the cornstalks must have entangled the wheels."



On the Western Front. Testing engines on renovated machines.



HOW TO ENGINE A BIG BOMBER?



Problems of Disposition.

THE newspaper yarns about big German bombers with three, four, or six engines are based on two technical truths. The first is that one 1,000 h.p. bomber can carry a bigger weight of "eggs" than two 500 h.p. machines. The second is that small bombs are passing out of favour. As yet the precise aiming of bombs, especially at night, is something of a lottery. If a 112 lb. bomb drops in the street outside a munition works, it will do no damage, but if a bomb weighing a ton just misses a building, it may nevertheless make a pretty mess. Consequently the tendency is all towards giant machines.

The main problem at present centres round the disposition of the engines, and the diagrams indicate various solutions. Let us suppose that the air staff of a belligerent ask the technical experts to produce a machine which will carry a certain weight of bombs, crew, guns, instruments, etc., a certain distance. After working out the weight of fuel and oil required for the journey, a total power of 1,000 h.p. is indicated. It may be arranged in several different dispositions, three of which are indicated in figs. 1-4. Fig. 1 is a plan of a machine with three engines of about 330 h.p. each. Fig. 2 shows a similar machine with two engines of 500 h.p. apiece arranged for double tractor drive. Fig. 3 a similar 'bus of the pusher type, and fig. 4 a four-engined aeroplane with two pusher and two tractor units; pending definite information it is fairly safe to suppose that fig. 4 approximates to the layout of the German machine captured by the French last week.

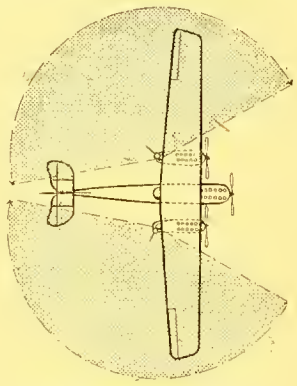


Fig. 1.—Triple tractor (330 h.p each), showing that forward field of fire is impossible.

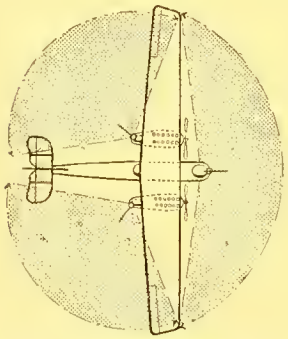


Fig. 2.—Double tractor (500 h.p. each), a pattern which allows a good all round field of fire.

In peace time pilots would undoubtedly plump for fig. 4. One great merit of multiple engines is that they enable the machine to flutter home with one or more "dud" engines. The more engines you have, the less are the risks caused by engine trouble. You will have to fly low, you will have to fly slow, you will have to use a lot of rudder permanently; perhaps by means of a trimming winch, but the 'bus will reach a safe landing ground. A four-engined machine will get home with two engines out of atcion, and with the port front engine and the starboard rear engine gone phut it will not be too tiring to fly. The machines shown in figs. 2 and 3, however, take a lot of controlling with either engine dud. So from a peace pilot's standpoint, fig. 4 is undoubtedly the 'bus, and a machine with eight engines arranged in double storeys above each other would be even safer, and still pleasanter to fly.

Continuing to pretend that there is no war on, the views of the repair staff must be considered. It is up to them to keep the bulk of their fleet in airworthy condition. They vote unhtsitatingly for the minimum number of engines. The pilot may say that an eight-engined machine suits his book, but it is some job to have eight engines in the pink at one and the same time. If the aerodrome boss 'phones orders for machine No. A52 to go up at once, and one of its eight engines confesses to a dud oil pump in the preliminary test of r.p.m., there will be a strafe. To insert a spare engine will occupy at least twenty-four hours. The mechanics prefer a single engine, and though they will tolerate two, they break out in cold sweats at the thought of eight.

As it happens there is a war on, and so the gunnery officer overhauls the plans before the designer is allowed to get a batch of two or three experimental 'buses put through the shops. The gunner tackles the engine question from a private viewpoint of his own. He is unsympathetically received by the aeronautical experts, but he doesn't care. With tanks and bomb arcks full, the machine's best gait may be 90 m.p.h., and her ceiling 10,000 feet. On her nefarious journeys she will be assaulted by nasty little hornets capable of 150 m.p.h. with a wicked habit of diving down on her from 20,000 feet by daylight and offering no decent target, or of lying under her and perforating her tanks with incendiary bullets from beneath. His pupils will be expected to beat off these hornets by superior fire power. He is going to see that their field of fire contains no blind spots, and that, if possible, at least two of her guns can concentrate on any point from which a hornet can attack. The shaded sectors

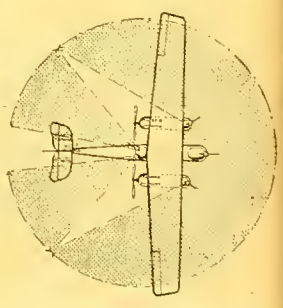


Fig. 3.—Double pushers (500 h.p. each). The stern field o fire in this type is poor

How to Engine a Big Bomber?—

in the various diagrams indicate the horizontal fields of fire obtainable with the various types. Actually, the overhead and underneath fields are more important, but the side fields make easier illustrations of this vital point. As the twin-engined tractor is easily the best in this respect, especially as regards the typical danger of it behind the tail, we know what the gunner will push for.

Finally, the aeronautical professor wires in. He insists that the thrust to be obtained from an airscrew depends very largely on the volume of undisturbed air which it engages. He uplifts his paws in pious horror at fig. 4, for its two pusher screws are engaging the whirling slip-stream accelerated astern of its twin tractor screws. He has grave doubts whether the centre screw in fig. 1 will not spoil the air for the side screws. In fig. 3, he opines, the air disturbances from the planes, struts, and wires will render the screws rather less efficient than they might be, and he howls for the double tractor design of fig. 2.

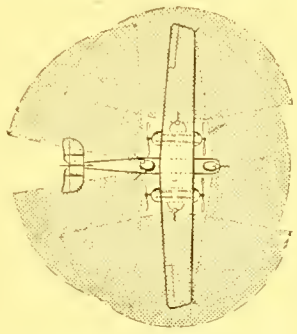


Fig. 4.—Four 250 h.p. engines, two tractors, two pushers. Bad side field of fire is the result.

When all these gentry have arrived at a compromise the manager of the raw material department comes along, and enquires where he is expected to get timber for the spars of a 60ft. or 80ft. wing. A humble member of the staff who specialises in splices begins to get busy. A tame inventor who has a notion of utilising bamboo falls out with a friend who has just patented a spar made of cold-drawn aluminium tubing, and the staff are left quarrelling and wondering when the next maroons will go off.

Landing in Standing Corn.

ON page 121 of the issue of August 8th we stated that a successful landing had been made in a field of standing corn, and asked if there were any rival claims or comments. Among the replies is the following from an instructor at a flying school. The letter contains a useful hint, besides being of general interest :

"Sir,—In the 'Aviation Section' of your issue of August 8th, you invite comments on 'Landing in a Cornfield.' In August, 1915, whilst acting as instructor on an 80 h.p. Gnôme-Bleriot monoplane, I was compelled to make a forced landing in a field of standing and nearly ripe wheat, owing to a broken inlet valve spring. Having replaced the defective valve, it was necessary to taxi the machine to a gap to enable me to get a suitable 'take off' from the adjoining field. The result of taxi-ing the machine through the corn was to make a very badly serrated leading edge to the propeller. This caused both noise and vibration, though otherwise did no harm.

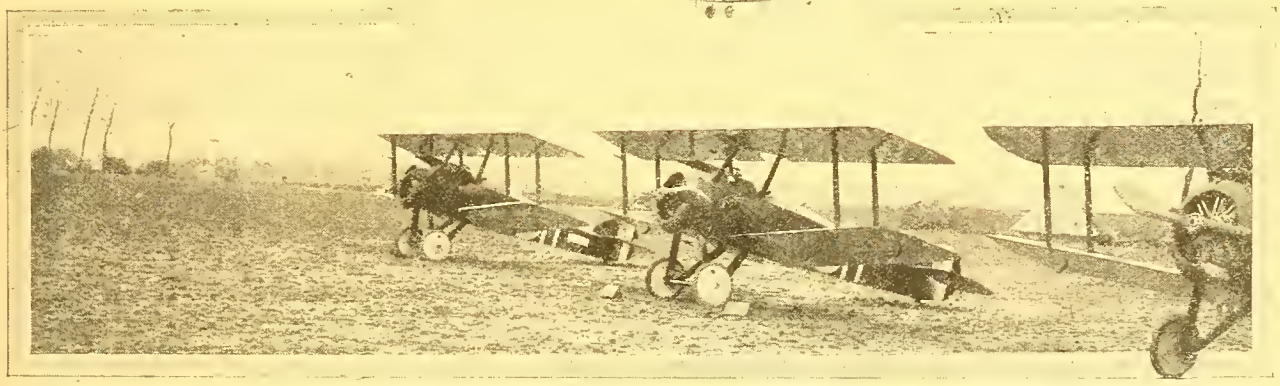
"I do not think that it is a difficult thing to land a machine in a field of standing corn, without doing any damage to the machine. Whenever a landing is to be made, whether forced or otherwise, the great thing to remember is to keep the machine in the air as long as possible, a few feet from the ground, and 'stall.' If this rule is followed, it is almost impossible to come to harm. One needs good judgment to land in this fashion in a field. Even if the field is overshot, the worst that can happen is a mix-up with the hedge.

"I hope you will print these comments if you feel inclined to do so. It may catch the eye of some 'fledgling,' and give him a tip which will be of the greatest use to him. I have always followed this rule myself, and out of some hundreds of forced landings on all sorts of machines I have never had an accident. I have seen many bad accidents through landing too fast. There is no point in doing so, and if the pilot makes a slight 'bump' he is apt to break his undercarriage or buckle a wheel."—T. (Portsmouth)

NOT 10,000 AEROPLANES IN ALL THE AIR ARMIES.

JOHN D. RYAN, Director of Aircraft Production in the United States, recently said : "The people of this country have been carried away with the talk of tens of thousands of fighting and bombing aeroplanes, and have been impatient when they have heard of the few we have produced so far. There never have been 10,000 aeroplanes on either side of this war at any one time, and until within a month, if even now, there have not been 10,000 on all sides and all fronts of the war added together.

"We must learn to think and talk of things we want to win with in the quantities that can be furnished and in the time required to furnish them. We will have aircraft in type, in quantity, and quality to accomplish what we have set out to do—to win the war. We have set that as our mark, and in the way of our progress there may be disappointments—but no failure."



An R.A.F. fighting 'plane returning from an expedition over the German lines

Sportsmanship in Aerial Fighting.

Froissart v. Bernhardi.

IF a solitary destroyer steamed close up to the guns of Heligoland and offered the forts battle, we should call its commander a lunatic, not a sportsman. If some British platoon commander on the Western Front forced his handful of men to try and break the Hindenburg line on their own, he would be court-martialled after the war if he chanced to survive. The business of war is to attack the enemy when and where your strength gives you a definite superiority in numbers, position, or in some other vital factor. This is logic, not sportsmanship. On the other hand, if a visiting team turns up a man short to play you at football, it is your business to offer them the best substitute you can provide, and thus to equalise the opposed strengths as far as you can. This is sport, not logic.

We are beyond question the most "sporting" nation in the world, and our natural tendency is to graft sport upon war, a tendency for which we have repeatedly paid the penalty in this and other wars. The high command on sea and land and in the air has had to teach our young blood that an excess of sportsmanship makes for very bad soldiering indeed. On sea and land the excess of the sporting spirit has been very largely pruned off: it survives principally in such things as generosity to a beaten foe, fearlessness in forlorn hopes, and a strict adherence to such few man-made laws as are recognised in war. In air fighting an exuberant sportsmanship was strongly marked on our side from the outset, partly because the fighting pilots were extremely young, partly because flying is essentially a sportsman's job. Hun pilots, on the other hand, were frankly logical right away from 1914. They fought as their artillery, infantry, and cavalry fought: to outnumber the enemy, to gain superiority of fire, to trick him into a perilous position.

An R.A.F. pilot pointing out on the map the spot where he brought down an enemy 'plane.

Chivalry or Strategy?

The generals who had to foster our embryo air forces had to decide whether to prune or to cherish the innate sportsmanship of young pilots; and at one time there were two schools of thought in the matter. The one upheld the ordinary logic of warfare, which may be summed up as, "Take no avoidable risks. Manœuvre for superiority. Then strike." The rival school saw that nerve and *morale* count for even more in the air than they count on land or sea. An offensive spirit in individual pilots, exaggerated almost to the point of sheer foolhardiness, would build up a magnificent *morale* in the corps. In a sense the fighting pilot is always nervous. The side which fears no odds, which relies on dash rather than logic, which can be trusted to attack under almost any conceivable circumstances, will ultimately "put the wind up" the other fellow to some tune. Never mind if many machines are lost, if many a young pilot dies early in his fighting career. The air force whose motto is "Attack" will establish a sure supremacy.

Thus at the present moment the "sporting" spirit has freer play in the air than in the army or navy; and to it we owe that "personal ascendancy" of our pilots to which Sir John French alluded quite early in the war.

When aerial fighting is a few years older, it will bow to the laws which have stereotyped land and sea fighting. The process has already commenced. Maj. Bishop in his "Winged Warfare" records a gradual change in his own methods. In his early days he yielded to sudden personal impulses, moods of excitement, and so forth Gradually he became more restrained, deliberate, cautious, and cunning. He has begun to resist impulses, to scheme and to plot, to refuse a risk because it is foolish. The air is filling up. The odds against the solitary rover grow too heavy. The crack pilot, relying on his machine, his gunnery, and his stunting ability, has no longer a reasonable chance of prolonging survival. Sportsmanship in warfare can be exaggerated to a point at which it closely resembles suicide.

TORQUE.

The German giant 'plane brought down last week by one of our night bombers contained five 260 h.p. engines, which drove both tractor and pusher propellers.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war

ILIFFE & SONS LTD.

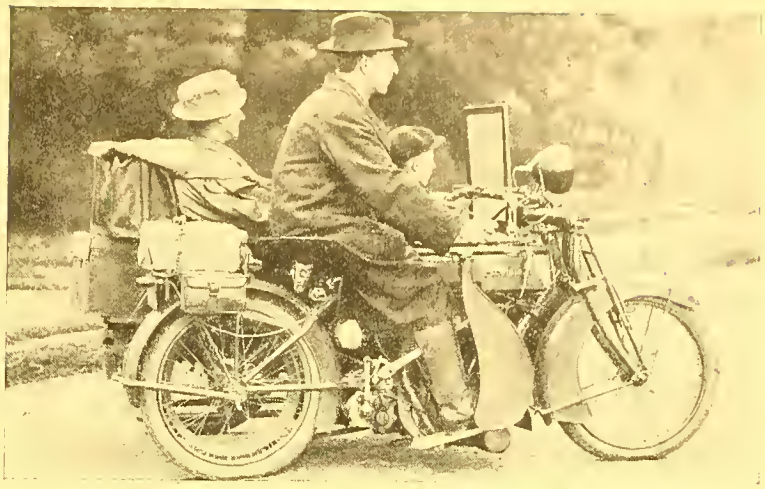
MOTOR CYCLE OR TRAIN?

A Few Details of a Run in North Wales in Wartime.

A Comparison in the Cost of Travelling.

MANY owners of motor cycles were fortunate in obtaining permits to travel to their holiday destination, and it is instructive to compare the cost of present-day motor cycling with train journeys. In the comparison may be found ample justification for the granting of a special permit to all owners for a single holiday run. We need not, however, state again that which we have so repeatedly emphasised concerning a concession which, had it been general, would have been so fully appreciated. The following details are given by the owner of an 8 h.p. British Excelsior who during Bank Holiday made the journey from Coventry to Llandudno. No doubt this single instance is typical of hundreds of others as regards saving of time and money, and the relieving of the terribly congested railway passenger traffic of those few holiday days. The owner says:

"The sidecar combination used was the 8 h.p. British Excelsior. The alterations to standard specification are the fitting of a three-jet Binks carburetter and a Grado vaporiser, the latter helping considerably in vaporising the inferior fuel. The total load as shown on the photograph is approximately 10 cwt. The mileage approximately 332, and the consumption six gallons of petrol and one quart of oil. The table below shows the comparative costs.

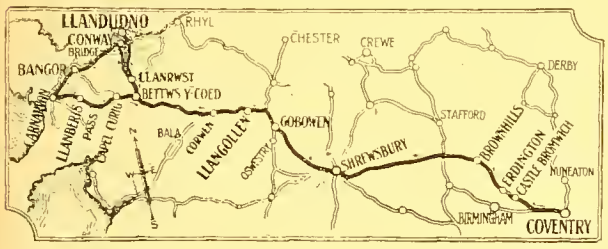


OFF FOR A BREATH OF SEA AIR.
The 8 h.p. British Excelsior ready for the journey, carrying a heavy weight of luggage and passengers.

Motor Cycle.		Train.	
Mileage from Coventry to Llandudno and back, 332 miles—6 gallons petrol, 2 quarts oil	£1 8 6	Return fares for 2 adults and one child	£4 6 5½
		Tips and cab fares ..	10 0
	£1 8 6		£4 16 5½
Time, excluding meals, 5½ hours		Time, 12½ hours.	

"The journey *via* the route given on map occupied exactly eight hours, from which time must be deducted about two and a half hours for meals, etc., whilst a friend of mine started from his house in Coventry to go by train at 12 o'clock midnight and actually landed at Llandudno at 12.35 p.m. the following day (time 12½ hours). With his wife and one child five years of age the railway fares, etc., amounted to £4 10s. He is not anxious to repeat the journey under similar conditions.

"*En route* by motor we found a fair proportion of motorists who appeared to be in minor troubles due to their machines having been put in dock for so long, but generally speaking the percentage was not great."



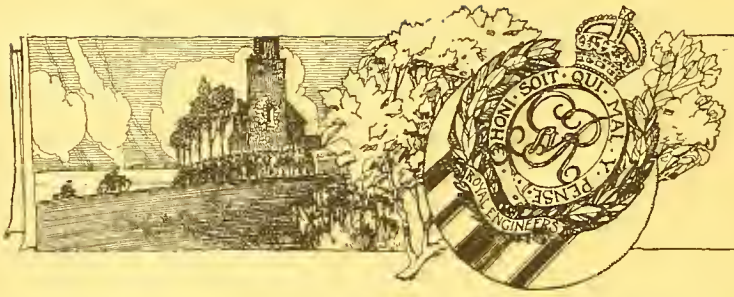
Map showing route taken. The return journey was made *via* Bangor, Carnarvon, Llanberis, and Capel Curig

BRITISH SCIENTIFIC PRODUCTS.

THE exhibition now being held at King's College, London, by the British Science Guild is a praiseworthy and successful attempt to illustrate the great efforts that have been made during the war to do away entirely with German dominance in any particular field of commerce. Products and appliances of many kinds are shown, all of British manufacture, which were obtainable before the war chiefly or solely from enemy countries, and include synthetic dyes, medicinal preparations, optical and photographic apparatus, surgical appliances, etc., in a variety and a degree very agreeable to contemplate.

Where road locomotion is concerned, there was only one thing, of course, for which we were dependent upon Germany before 1914, and that was the magneto. In the exhibition, however, may be seen an extensive range of British products in that line, and there remains no manner of doubt that, when the war is over, the home industry will be fully equal to all requirements, as to quantity and quality alike.

The aircraft section will repay inspection, as it includes a comprehensive array of exhibits designed to show the methods of aircraft production, particularly with respect to wood treatment, the manufacture of dope, paints, and cables, and numerous instruments. Several aircraft engines are also shown, including the famous Rolls-Royce Eagle. The exhibition will remain open (from 12 to 8 daily; Saturday 10 to 2) until September 7th.



MILITARY NOTES.

Army and Navy. The Hun D.R.'s Machine.

THE TANKS IN MATZ VALLEY.

THE Tanks—especially the Whippets—appear to have had a merry time in the last big attack on the Western Front. They rounded up retreating transports and obliterated machine gun nests, even capturing batteries. The stories, humorous and tragic, of the numerous incidents in connection with the Tanks' great exploits would make a book—and an interesting one, too.

COMMANDER G. W. HILLYARD, R.N.

WE recently met Commander G. W. Hillyard, R.N., the well-known tennis player. George Hillyard was in the Navy many years before the war, and for a long period had been on the retired list; however, as soon as his services were needed he joined up again, and has been hard at it ever since August, 1914. He was an old friend of, and one-time shipmate of his contemporary, the late Rear-Admiral Sir R. K. Arbuthnot, and on the eve of the Jutland battle these two splendid veterans were playing tennis together, and it was merely luck that prevented Hillyard from joining the Admiral in the ill-fated *Defence*. Fortunately, however, he went to sea in another ship, and so survived the famous battle. At the present moment he is the proud possessor of an 8 h.p. British Excelsior, which he says is one of the finest sidecar machines he has yet handled. With him was his son, as tall as, if not taller than, his father, brought up a motor cyclist from his youth, and now a major in the Gunners.

AN OLD REX RIDER.

WE recently had the pleasure of meeting W. A. Jacobs, who has competed on Rex and other makes of motor cycles in various long-distance trials in company with his inseparable companion, J. P. le Grand. At the beginning of the war, Jacobs enlisted as a despatch rider, R.E., and just as he was ready to proceed Overseas he was run over by a motor lorry, which broke his leg in several places. He is now on home service in London, while le Grand is in Salonica.

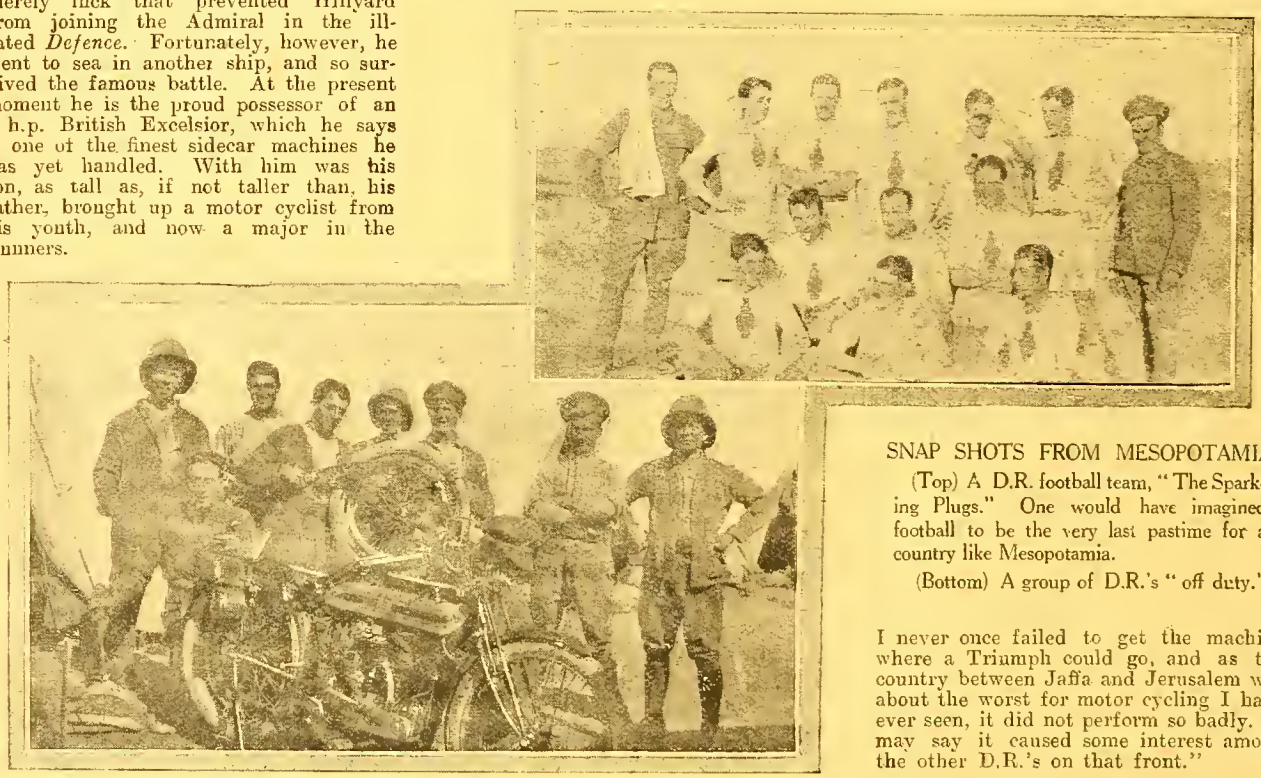
"THE SPARKING PLUGS."

CPL. W. PAYNE, 3rd Indian Signal Co., E.F.D., writes: "I enclose a snap of our D.R.'s team, taken while in Mesopotamia. The shirts were very difficult to obtain, so we used cotton vests with a large plug painted on by a stencil, the design of which was made from the Lodge plug advertised on the cover of your paper, *The Motor Cycle*, which still arrives, is greatly welcomed by our lads, and we all wish it continued success."

THE GERMAN D.R.'s MACHINE.

PTE. J.G.L., writing from Salonica, says: "I am sending you a few particulars of a German motor cycle which we captured, together with its rider, in Palestine. The details may be of interest to some readers: *Name*, Wanderer. *Engine*, V twin (about 3-3½ h.p.). *Oiling*, mechanical and hand pump. *Gears*, two-speed in rear hub, operated by lever on top of tank through Bowden wire. *Clutch*, in rear hub, operated same as gears. *Transmission*, belt. *Magneto*, Bosch. *Springing*, front and rear. *Starting*, pedals and chain to rear wheel. *Handle-bars*, touring type (which we soon converted to a better shape). The belt pulley was not mounted on the engine-shaft, but geared to it, and could be moved through an arc by means of a handle on the tank, which operated a worm gear, and enabled the tension of the belt to be adjusted at will. I should think the gear ratios were: High, 5 to 1; low, 12 to 1.

"I rode this machine for some time while with the —— Mounted Brigade H.Q., and although I changed to a Triumph as soon as opportunity occurred, I never once failed to get the machine where a Triumph could go, and as the country between Jaffa and Jerusalem was about the worst for motor cycling I have ever seen, it did not perform so badly. I may say it caused some interest among the other D.R.'s on that front."



SNAP SHOTS FROM MESOPOTAMIA.

(Top) A D.R. football team, "The Sparking Plugs." One would have imagined football to be the very last pastime for a country like Mesopotamia.

(Bottom) A group of D.R.'s "off duty."

THE AERO-MOTOCYCLETTE.

Early Experiments with Air Screw "Transmission."

A CONTEMPORARY questions whether any bold spirit has ever driven a motor cycle by means of an aeroplane propeller. The application of this system of "transmission" formed the basis of a number of interesting experiments carried out just prior to the war.

Our older readers may recollect that twelve years ago, in the issue of *The Motor Cycle* of September 19th, 1906, an article was published which described some interesting experiments carried out in this direction in France. We cannot do better than quote liberally from this article. It begins by stating that "several engineers interested in aerial navigation have predicted that the motor cycle will solve the problem of the heavier-than-air type of flying machine."

"On the Achères Road, near Paris, on Wednesday last, M. Ernest Archdeacon gave a private demonstration of a new type of machine which is destined to show what it is possible to do with a light propeller attached to a motor cycle driven by the usual type of racing engine. The road selected for the trial was situated in the midst of a plain, and stretched dead flat for five kilometres, so that there could be no question of a descent assisting the machine. After one or two preliminary trials, the kilometre was covered in 45⅖s., or at the rate of nearly fifty miles an hour."

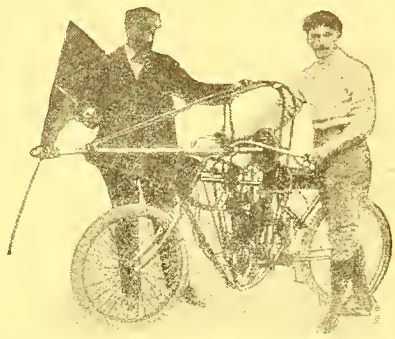
Monsieur Archdeacon's Aero-Motocyclette, which accomplished a speed of fifty miles an hour in 1906

Achievement and Prophecy.

The machine was a 6 h.p. twin-cylinder Buchet. The engine was placed across the frame, driving the propeller by means of a belt. The engine was run at 1,500 r.p.m., and the propeller at 1,100 r.p.m. The propeller blades were made of aluminium, drilled all over to lighten them, and afterwards covered with gold-beater's skin. The weight of this complete *aero-motocyclette*, as the French called it, was 154 lb., and the weight of the rider (the well-known Franco-Italian aero engineer, Anzani) was 12 st. 12 lb.

The conclusion of our article is worth quoting: "M. Archdeacon is merely using this machine to study the effect of the propeller at speed, and if everything turns out to his satisfaction there is no doubt that sustaining wings will be fitted later, and the motor cyclist may probably make some aerial flights. The chief difficulty, we understand, up to the present, with sustaining wings or aeroplanes has been to keep them in a horizontal position, so that the pilot can descend safely to earth in the event of the propeller force failing through any cause."

It was, of course, the brothers Wright who, by warping the wings, enabled the pilot to balance his aeroplane, while a later improvement and the method now in common use was the fitting of ailerons.



Another view of the Aero-Motocyclette

HOLIDAY PETROL.

MUNITIONERS ALONE TO BE PRIVILEGED.

IN connection with the concession recently extended to motor cycling munition workers, permitting them to use their machines on journeys to and from their holiday destinations, the following correspondence ensued between the Automobile Association and the Petrol Control Department:

"29th July, 1918.

"The Petrol Controller, 19, Berkeley St.

"Sir,—I am directed by my Committee to ask the favour of your special attention to the situation which has arisen from the concession recently extended by you to motor cycling munition workers, enabling them to use their motor cycles in the course of their annual holidays.

"On behalf of the many thousands of members of this Association who are affected, my Committee beg strongly to protest against such preferential treatment of one section of the motoring public. If it be possible to allow motor cycling munition workers to consume a portion of their petrol allowances for return journeys to their holiday destinations, I am to submit that it should not be impossible to permit all motorists now using their cars and motor cycles under licences from you to enjoy the same privilege.

"I need hardly point out that if the concession were extended on these lines, as it should be, the consumption of petrol would not be increased, in that the necessary amount used for the holiday journeys would be taken from the licences issued for business or national requirements.

"STENSON COOKE, Secretary."

"31st July, 1918.

"Sir,—I have to acknowledge the receipt of your letter of the 29th July, with reference to the concession recently extended to munition workers enabling them to use their cycles to take them to and from their holidays.

"P. G. L. WEBB, Deputy-Controller."

"1st August, 1918.

"The Deputy-Controller, 19, Berkeley Street, W.1.

"Sir,—I have to thank you for your acknowledgment of my letter of the 29th ult.

"In view of the great importance of this matter to motorists, many of whom are making arrangements in connection with their holiday vacations, may I ask for an early decision upon the point raised in my communication.

"STENSON COOKE."

"13th August, 1918.

"P. G. L. Webb, Esq., 19, Berkeley Street, W.1.

"Sir,—May I remind you that I have not received a reply to my letter of the 29th ult. You kindly acknowledged this communication on the 31st ult., but nothing further has transpired.

"STENSON COOKE."

"13th August, 1918.

"Sir,—I have to acknowledge the receipt of your letter of the 13th August, and to refer to your previous letter of the 29th July, and in reply to inform you that the Controller regrets that he cannot see his way to extend to all motorists the concession which has been made to certain motor cycling workers. This concession was granted in view of the difficult conditions under which the work has to be carried out in certain congested areas, and is limited to (1) munition workers, (2) dockyard and other Admiralty workers, and (3) workers in the coal mining industry.

"P. G. L. WEBB, Deputy-Controller."

[We ourselves communicated with the Petrol Controller to the same effect and with the same result—the correspondence being published on page 116 of the issue of August 8th.—ED.]

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle." Hertford Street, Coventry, and must be accompanied by the writer's name and address.

PETROL FOR HOLIDAY MAKERS.

Sir,—I beg to congratulate you on your well-argued appeal for permission to use petrol for holiday journeys. It deserved a better fate. There is one suggestion I should like to make, and that is that, as we may not use the few gallons that most of us have in stock, the Petrol Controller should take them over and issue in exchange vouchers for the supply of a similar quantity when there is any available for general use. This would obviate the waste that is now going on through evaporation and through ever-increasing staleness.

F. PORTE.

PETROL FOR SOLDIERS ON LEAVE.

Sir,—I have noticed in your very interesting paper a good many complaints from Service men from Overseas who have not been able to obtain a petrol licence.

I had absolutely no trouble at all. On arrival in England from France the very first place I called at was the Petrol Control Board in Berkeley Street. There I had to show my pass and fill up a form, which was taken by the hall porter (or whatever he is) to somebody in the building. He returned in a very few minutes and told me it was accepted and they would post me my licence so that I should get it the following morning, and sure enough it came, enabling me to purchase two gallons of petrol, with which I mixed a good quantity of paraffin, and therefore had a jolly good tour.

I have been a motor cyclist for the past five years, and nothing has taught me more about motor cycles than the good old "Blue 'Un," which I have not missed for that period.

P. AND M.

A STIFF CLIMB.

Sir,—In reply to your query whether Bredon Hill has been crossed by a motor cycle, I may say that a friend of mine accomplished this feat on a 2¾ h.p. single-geared Levis shortly before the war, crossing it in the direction you mention.

I cannot now be certain that the journey was completed in the saddle—in fact, I believe not.

I notice a Colonial correspondent asks for names of firms manufacturing model steam engines, also text-books on them. Possibly Messrs. Bassett-Lowke, Ltd., of Northampton, could supply the engine parts, while for literature I would suggest he apply to Percival Marshall and Co., Poppin's Court, Fleet Street, London, who are the publishers of the "Model Engineer."

May I take this opportunity of stating my appreciation of the articles of historical interest that have lately been appearing in your journal with illustrations of old and long-forgotten machines.

I am sure that retrospect is occasionally good for all of us, and such articles and illustrations serve to remind those of us who are not altogether novices of the fearful and wonderful "beasts" we once saw upon the highways, and even possibly rode.

I can call to mind several very interesting old racing machines, such as the 14 h.p. water-cooled N.S.U., shown at an early Paris show; the 6 h.p. twin Roc for the International Cup Race, with side-by-side vertical cylinders and flywheel between, *à la* Scott; and the four-cylinder Clement, ridden by Marius Thé—all machines unknown to present-day riders. Some of the old tricars also were extremely unconventional, such as the 6 h.p. twin Clement Garrard, with, I believe, an open spring frame (this was, if I remember rightly, an experimental model, and about the last built by the firm), the Arielette of *circa* 1908 constructed on the lines of the old Bollée tandem; and the last Humber design with engine beneath the seat, to say nothing of such famous warriors as the Phœnix Trimo, Lagonda, Raleighette, Rexette, Riley, etc., and many others now passed away.

I think there would be many readers who would appreciate further series of historical interest if you will pardon my presumption in offering suggestions.

C. STANBURY MADELEY.

PETROL FOR DISCHARGED SOLDIERS.

Sir,—Being a constant and enthusiastic reader of your excellent paper, I seldom miss anything of interest in your popular Correspondence column.

I consider the suggestion put forward by Mr. John Massenia, in your issue of August 8th, a very laudable one, and I think that if this scheme could be brought into operation it would be the means of considerably popularising the War Savings Certificates.

Now, sir, your very popular journal has never tired of approaching the Petrol Executive on the motorist's behalf, and I feel confident that something may yet be done to brighten our outlook.

I would like to suggest that, if any such scheme be adopted, the position of discharged soldiers—men who have perhaps risked a little more for England than the nevertheless-necessary munition workers—should receive first consideration.

J. COOPER.

OVERLOADED PASSENGER MACHINES.

Sir,—In last Thursday's issue of *The Motor Cycle* I saw a reference to an overcrowded Morgan with four up and luggage. I think I am the owner of this particular lot. It is a 1916 red Grand Prix model with Raleigh disc wheels.

I started with my wife, son, and daughter for Brighton on the Sunday (August Bank Holiday) at twenty minutes past eight, stayed at Crawley forty minutes, and arrived in Brighton at ten minutes to eleven. Although well loaded, I was not kept back from a little speed, as the flying officer with the Zenith with green tank, whom I met on the road, can testify. On this particular Zenith were the words in large block letters OTO. It seemed to pass me like a flash on the switchback. Then some distance up the road the rider waited for me, and immediately I passed he mounted and flashed by me again, I myself doing twenty-two at the time. Anyhow, I kept even distance away for mile after mile, until reaching a long rise somewhere about Bolney. The rider looked round to see if I were coming, and as he did so I opened out, caught, and passed him at well over the legal. I do not think he will again try to show his tail to a red Morgan, though overloaded.

I might mention that this is the first machine with which I have ever been able to do Brighton and back in top gear with passengers, not having had to change down except for getting away from standstill. This is my second Morgan, the first being a J.A.P. air-cooled sporting model. I must say these machines are absolute marvels for both pulling and speed, the only thing that I should like to see altered on them being the steering. This is tiring, and wants a lot of holding if one gets a wobble on. It can easily be rectified by having less lock; this means a shorter crank on the end of steering rod. (On both Morgans this has overcome the trouble.) The ride home up Handcross hill was accomplished in top gear, to my surprise, the speed going down to twenty-seven just before reaching the top. I think this should alter one's opinion as to overloading.

WILLIAM CARTER.

GRINDON HILL.

Sir,—Noting your photograph of Grindon Hill in a recent issue of *The Motor Cycle* calls to my mind that Mr. S. W. Philpott, of Liverpool, and I were responsible for the inclusion of this hill in the trial. The day we found it the surface was dry. During the day of the trial it was so greasy as to be almost unclimbable.

I was driving a 3½ h.p. sidecar combination, and, although my wheel (well shod) was driving forward, the machine was sliding slowly backwards. But with the same machine on a dry day I can comfortably carry four 10st. passengers.

At the time of the trial I was amused at the photographs of the hill which appeared in the motor papers, as these were taken from such a point as to make the gradient appear about 1 in 1½, which it was not. J. HASLAM.

THE 1918 HARLEY-DAVIDSON

Sir,—It is unfortunate we cannot see some 1918 Harleys on the road They are undoubtedly the finest machines—English, American, or Germ-Hun—ever built, and I have found mine most reliable. Since 1915 I have only had to replace an exhaust valve—truly some recommendation. May I be allowed to state a few of its excellent qualities, namely: Sufficient power, large radiating fins, mechanical oiling, aluminium crank case, stability of the frame, encased exhaust valve springs, the gear box and clutch of ample dimensions and strength, wrist controls, double tanks, 28in. ×3in. wheels, and last, but not least, the excellent appearance.

L. G. MITCHELL

RICHTHOFEN'S DEATH

Sir,—I have never, so far, written to your paper in argument against anybody or anything, but a letter in your issue of July 18th, signed by R. G. McLeod, being all wrong, forces me to do so, and I shall be very much obliged if you will spare me a little bit of space in your next issue

At the time of the baron's death there was a heated argument between the Lewis machine gunners and the squadron which happened to have been scrapping the circus at the time, and finally, by reason of proof, the honour of shooting down the baron was officially given to this squadron.

The story of the scrap is this: One of our squadrons of scouts discovered the circus worrying some of our artillery machines, so immediately attacked it. During the fight the Red Baron dropped on to the tail of one of our scouts and pursued it. Another of our airmen, seeing his friend in difficulties, dropped on to the baron's tail, and the three machines sped westward. As soon as they came within range of our machine gunners, they (the machine gunners) opened fire. At the same time the baron steadied his machine for the final shot. This opportunity was immediately seized by the pilot on his tail, who let him have it with his guns. The baron's machine then wheeled round, went out of control, and crashed to the ground.

The body was afterwards examined by several doctors. The bullet had entered the back and gone straight through the heart, and it was proved that the gun which fired that shot could only have been behind and above the baron.

LT., R.A.F.

WANTED—MORE CHOICE OF THREE-WHEELERS.

Sir,—I wonder how many readers of *The Motor Cycle* are placed more or less in a quandary in regard to their purchase of a post-war machine, as I am myself.

Previously to joining up early in '15 I had had four years of sidecar work, and found that for two passengers, and if necessary three, it was a very pleasant and economical form of motoring. But, while my sidecar passenger was lounging in rest and ease and free from dust and mud, I was subjected to all forms of road filth.

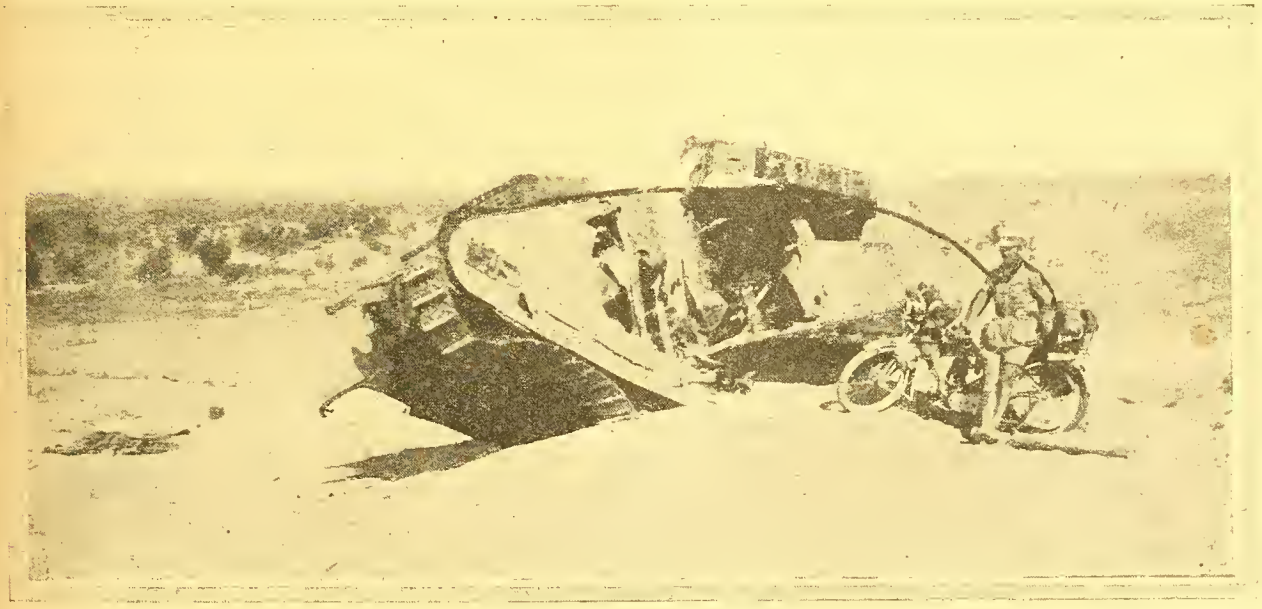
All things being equal—which, however, they never are—I hope to have somewhere about £150 to spend, after the war, on something in the motor vehicle way; but what shall it be? If I buy another sidecar outfit I am "as you were." I do not want a Ford or a second-hand light car for reasons of upkeep, taxes, and garage, which leaves—anyway at present—the Morgan as the sole alternative.

My requirements are not very great. I do not desire great speed—an average of 20 m.p.h., coupled with reliability and low running costs. Probably the machine will only be used for pleasure during odd hours in the evening and at week-ends; but I *do* desire to keep myself clean, and be able to go out on a run when the weather is in an uncertain mood, without looking like the skipper of a racing motor boat.

And what of the Morgan? Men I meet in the Service who belonged to the open road in the piping days of peace hold all sorts of opinions on this machine. Some say, "Splendid; no trouble; beats the sidecar hollow." Others say, "Oh, you'll get trouble with chains and back tyre repairs, and she'll turn over in grease."

But why are we left with only the Morgan as a clean and economical form of three-wheel motoring for two? I judge from *The Motor Cycle* that the general tendency of the big makers—and they are the people who count—is to elaborate the sidecar outfit as a post-war model. I picked up a catalogue the other day of a well-known 8 h.p. model, and found on totting up prices that their outfit, complete with accessories, would cost over £150—and the driver thereof no better off in the way of cleanliness than he was in 1908. RIF-RAF.

Calshot.

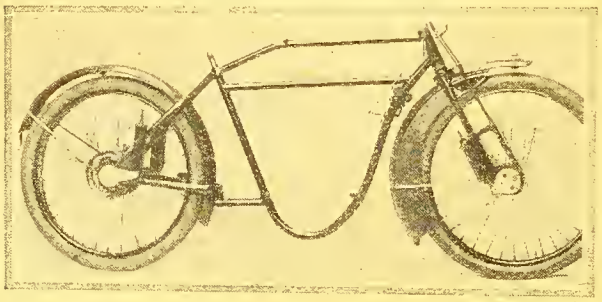


A derelict tank in the Eastern desert.

A SPRING FRAME DEVICE.

Sir,—I am a constant reader of your excellent paper, and am pleased to see you have published part of my specification. I may let you know that the above is no paper patent, and enclose a photograph of my 1912 7-9 h.p. Indian with both wheels fitted. The rear wheel was fitted up in April, 1917, and the front wheel in October of the same year, but unfortunately, owing to the restrictions, the test on the front wheel was limited. The photograph shows the front wheel springs depressed and the rear wheel in normal position.

I improved the front wheel by making all the parts slightly larger, which gives more rise and fall motion. The improvements were completed at home in my spare time, which is very limited, and has been since the war broke out. I had to drop the usual practice of brazing, and adopt the small pins tapped through the frame. Though I did not like this idea, it has proved quite satisfactory.



Mr. Thos. McLeod's springing arrangement on an Indian frame

My machine is dismantled at present for a thorough overhaul, but should anyone have a desire to test its merits I will be pleased to hear from him. At present I am making the parts for a 6 h.p. Enfield combination owned by a personal friend. After the war I hope to be in the position to take orders to convert existing rigid frames.

I used the machine during the season of 1916 in its original form. After the alterations I rode the machine from May until September, 1917.

The latter period was completed without breaking a spoke, and with tyres as hard as a board. I cannot describe the pleasant sensation of driving at a good speed combined with an easy rise and fall motion. I have the springs so nicely adjusted that even on a practically level surface they are continually in motion. The whole weight of the machine is resting on the springs all the time; the rebound is thus very slight. The V extension pieces on each end of the hub spindle are very important: they take all lateral strain on the wheel, and they are so rigid that the machine can be used with one spring out of action.

Moreover, when the wheel is being inserted the V extensions automatically keep it in true alignment with the frame, thus simplifying the belt or chain adjustment. The small hole shown in both levers is part of the locking arrangement. By reversing a bolt in the frame, the levers can be fastened to the frame in the event of both springs breaking. It will be seen that all springs are enclosed, and that dustproof caps can be fitted to the top guides.

THOS. McLEOD.

IN PRAISE OF THE V TWIN.

Sir,—This is undoubtedly an age of flat twins and four cylinders, but it seems that other well tried types are in danger of being overlooked. The single has its partisans, and has been well upheld in your pages; but very little has been said in favour of the V twin. This is a well tried type, which is doing good work in all sorts of conditions, and it is hardly fair that it should be quite ignored in favour of the new comers.

There are a great many riders who insist on big engines for several reasons. One man wants brute force to pull a heavy outfit over difficult roads at a good speed. Another wants an engine which will do comparatively light work with the minimum of fuss and noise. He hates the clatter of a small, high-speed engine, whereas the nonchalance of the big machine appeals most strongly. And then there is the solo road-burner, who does not want to be perpetually tuning a small engine in order to render his high averages possible. Moreover, is there a 1,000 c.c. flat twin which will fit in a decent frame?

I am quite aware that a highly efficient flat twin of 750 c.c. will do quite as much as a flabby single of 1,000 c.c. But some of us do not want highly efficient engines. They are noisy, inflexible, and a lot of trouble generally. They must "rev." to develop their power, and that means frequent gear changes. No decent driver objects to changing gear when it is necessary, but we all like an engine that makes it necessary as rarely as possible.

Some readers will think of the 750 c.c. flat Matchless, and its makers claim that it will do all that the old 1,000 c.c. machines could. But mount it in a single-geared solo frame, with a 4 to 1 ratio, and would it climb any hill (bar freaks, of course) in the country? The makers' catalogue used to claim this as possible with the old V's.

But even if some genius does manage to mount a big, slogging flat twin in a decent frame, I question whether experienced riders will rush in to buy. I have several reasons for saying this.

First, lubrication. The splash system, well carried out, gives very fair results on singles and small angle twins, but on flat twins it is positively unsatisfactory. The margin of error is too narrow. A shade too little oil and your front cylinder dries up, and a shade too much oils up your back plug. An experienced man can largely avoid this; but, if he has any serious riding to do, he will not put up with the perpetual threat of trouble. The only real solution is a costly and complicated system of forced feed to all parts.

A long induction pipe is another inevitable curse on a flat twin. Anyone who has done a long run in winter with no artificial heating will agree with me. Of course, the pipe can be heated, but no one likes these complications.

Mud is a much more serious enemy to the flat twin than to the V. It is very difficult to ward off mud without screening the cylinders. Look at any flat twin after a long, dirty ride. The valve gear is smothered, and the lower fins are so caked up that they might as well not be there. Valves should be enclosed on any engine; but, even so, they are better out of the way of dirt.

I have one more "grouse" against the flat twin. It is unwise to ride one in good clothes without wearing some sort of leggings. However spotless its outside flywheel may look, it invariably attains an even higher lustre at the expense of one's trousers. Quite a serious matter on a utility machine.

With a four-cylinder, cost, to me, seems the greatest drawback. A four-cylinder must cost more than a twin of eqnal quality and similar specification. This is not only due to the cost of the engine, but also to the difficulty of accommodating it in an ordinary machine. The frame is fairly easy, but the transmission must be well designed and well made, and, therefore, costly.

I do not wish to imply that all V twins are perfect. Some are brutes. But a few English and a few foreign firms have proved that really good V twins are possible, with careful design and workmanship, and, above all, attention to balance. They sit easily in an orthodox frame, and lend themselves to simple transmission, thus making for cheap production.

Flat twins and four-cylinders are not the only pebbles on the beach. BINKER.

MOTOR CYCLISTS AND THE ROYAL AIR FORCE.

Sir,—When the Royal Flying Corps came under the Royal Air Force and the re-classifying of ranks as "technical" and "non-technical," it came as a surprise to motor cyclists to be classed with the latter.

Anyone with experience will agree that a despatch rider requires a *good technical* knowledge, as much as, if not more so than, a M.T. driver.

When enlisting in the R.F.C. one had to pass a "technical" test quite separate from the riding test.

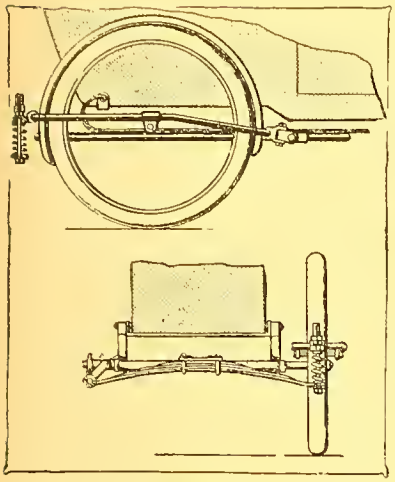
By all accounts some are given to understand that repairs are done in the workshops; such is a rumour, as from my experience (eighteen months riding in the desert and in Palestine) machines "konk out" when one is out with despatches, and not when standing outside the orderly room or workshop.

When we were under the R.F.C. we were classed as "technical," so why not so under the R.A.F., instead of being classed with "cooks" and "batmen"?

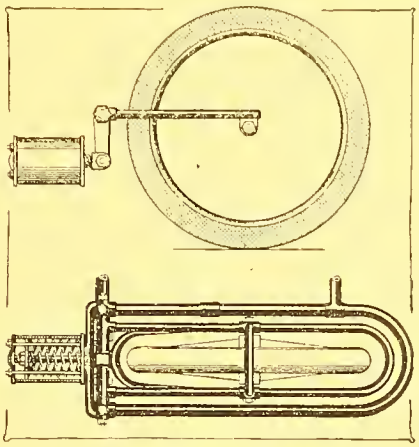
Palestine. D.R., R.A.F.

SIDECAR SUSPENSION.

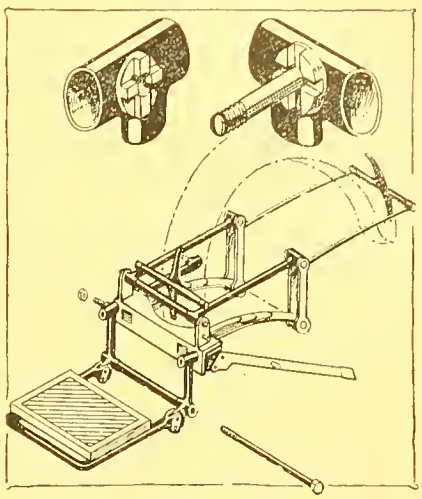
Four Inventions for Springing the Sidecar Wheel.



The Finlay spring wheel



The Adams system of springing



Details of the Royal Ruby sprung wheel

OF late there has been a lively interest in springing problems displayed by patrons of the Patent Office, and, apart from the large number of spring frame inventions brought about by *The Motor Cycle* campaign in favour of such devices, quite a number of inventors have turned their attention to springing the sidecar wheel.

It is the man who rides beside a side car, rather than its passenger, who appreciates the necessity for providing some means to absorb road shock on the sidecar chassis. Generally the body load is very well sprung, and the passenger seldom realises the great shocks to which the chassis is subjected.

On this page we illustrate four recent patents, of which one, the Finlay design, emanates from Australia, which country, by the way, bids fair to produce its full share of mechanical inventions.

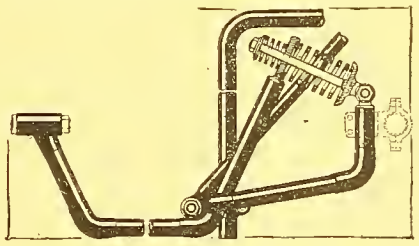
Laminated Springs.

The Finlay design embodies a transverse laminated leaf spring, connected to the wheel frame by a shock absorber spring at one end, and shackled at the inner end near to where the chassis is attached to the cycle frame. The wheel frame is pivoted at its forward end on a cross stay of the chassis.

The Royal Ruby design also employs laminated springs, but these are of the quarter elliptic type. The design is well thought out, and embodies a folding step and sidecar stand—two features which many sidecar owners will appreciate. The drawing is so clear that a lengthy description is not necessary. It is interesting to note, however, that the wheel carrier, its springing, the step, mudguard, and stand, form a complete unit which is fixed to the chassis by two long bolts having a form of "dog clutch" boss or head to engage with companion fittings on the sidecar frame. These are shown in the small drawings

Coil Springs.

The third design is by Messrs. Adams and Willcox, two Wiltshire engineers, and consists roughly of a pivoted wheel frame utilising coil springs contained in a casing, as the shock-absorbing element. These coiled springs are adjusted as may be desirable by means of a nut and disc The principle of the invention is clearly shown in the drawings.



Rear end view of a spring sidecar frame patented by the Triumph Cycle Co

An Unusual Design

The fourth illustration depicts an interesting invention of Mr. G. E Stanley, patented by him and the Triumph Co. The main sidecar frame, which carries the wheel and the body, has a longitudinal pivotal attachment to the motor cycle frame so that the two are resiliently connected.

The object of this device is not so much to insulate the machine from road shock as to prevent the shock sustained by either side car or motor cycle being imparted to each other.

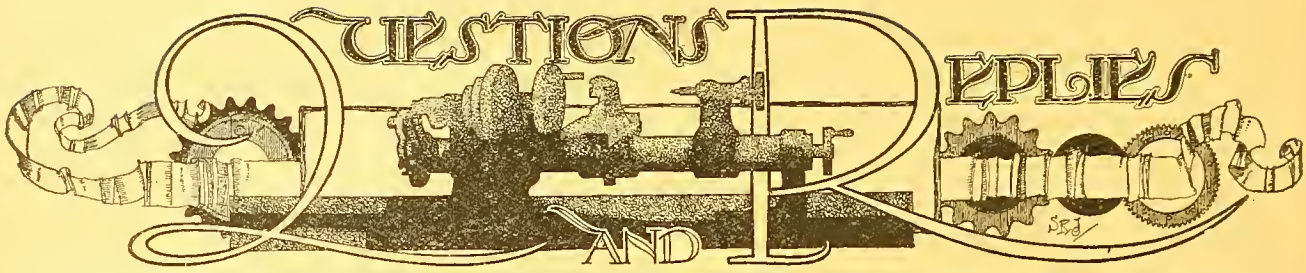
It will be seen that movement of the motor cycle frame upon the sidecar chassis is resisted by a coil spring similar to that employed in the Triumph spring fork.

This invention attacks the springing problem in a way untouched by the majority of inventors, and promises to do much to reduce the shocks sustained by both the motor cycle and the sidecar in combination, and no doubt its development will be watched with interest by motor cyclists.

THE FUEL SITUATION.

INTERESTING information is embodied in a recent report of the Home Fuel Oil Committee. The committee's report states that the best method of production is the carbonisation of cannel coal in existing vertical retorts at gas works, although no very largely increased quantity of oil can be obtained from this source during the war owing to difficulties of labour, transport, etc. The Petroleum Research Department had recommended the erection of batteries of a form of low temperature retort for the carbonisation of cannel coal, but an experimental investigation of low temperature processes by the Ministry has proved that the suggestion was impracticable on the ground of expense, shortage of labour, time involved, and the fact that the mineral is not available in the quantities which the first investigations indicated, though there will be other sources available in the future. These are, boring for oil in Great Britain, further development of the Scottish shale oil industry, and the increased carbonisation of raw oil, which latter should yield 1,250,000 tons of fuel oil from every 20,000,000 tons of coal carbonised With regard to the boring for oil, a well-known firm has offered to place its entire geological and oil expert staff gratuitously at the disposal of the Government.

The firm in question is now waiting for a Bill to be passed to restrict indiscriminate boring before commencing operations, so that the matter is subject to the usual Governmental delay and equivocation.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

A D.R. V.C.?

To settle a little bet, will you please inform me if, during the present war, the V.C. has been won by an R.E. despatch rider while engaged as such?—J.C.

We are sorry we cannot give you an absolutely conclusive answer to your question, but, so far as we are aware, no despatch rider has received the V.C. for work done while engaged in his duties as a despatch rider.

Petrol for Munition Workers.

I am a munition worker and have been working nights for the past two years continually and I wrote to the secretary of the N.M.C.F.U. about a permit to travel by cycle for the August holidays to Pleasley, Notts, and explained to him where I was working, where I wanted to go, and that I had kept machine registered and driving licence up to date, for this purpose and would he send permit, this was as soon as I saw it in *The Motor Cycle* and receiving no answer wrote again before the holiday, each time enclosing a stamped addressed envelope, but got no reply and I was wondering if I could still get permit. I am also a member of the N.M.C.F.U. and said so.—W.G.

We can accept no responsibility for the organisation to which you refer. You might try a letter to the chairman mentioning the matter to him.

Overheating.

I have a 3½ h.p. Brown motor cycle and sidecar. The engine gets very hot after running anything from one to three miles. I have tried various timings, all to no purpose. It is a 1908 machine, with an old B. and B. carburetter and Bosch magneto. (1.) The lift on the exhaust valve is ⅛in.; is this enough? (2.) Would another carburetter cure the overheating?—W.P.M.

The information you give is rather too scanty to serve as a groundwork for forming a definite estimate of the trouble. Provided the valve and magneto timings are correct, it may be that the silencer is choked, or that you are using too high or too low a gear. The valve lift should be sufficient for that type of engine, and, of course, a more modern carburetter would be an improvement, but we do not think it would cure your trouble. You might try using a smaller jet.

Capabilities of a Machine.

My machine is a racing Martin-Jap, quite "stripped," *i.e.*, no mudguards or carrier, and is fitted with a Binks automatic carburetter, C.A.V. magneto, 1914 racing J.A.P. engine, with overhead valves. (1.) What is the greatest speed I could coax it to do? (2.) Greatest mileage per gallon? (3.) I have a little petrol in stock. Could I use this to go to and from agricultural work? There are no other means of conveyance, and we have no horses. The work itself is purely voluntary, and is not to earn a living.—L.B.

You do not give the power of your engine, and your description would fit either a 4 h.p. single or a 5-6 h.p. twin. Assuming it as the twin: (1.) Sixty m.p.h. (2.) Seventy, but not at sixty miles per hour. (3.) It is impossible to say, as magistrates vary so much on this question, and the result depends on their interpretation of the Order; in our opinion, yes.

Clutch Slip.

Please tell me (1) how to tighten the clutch on my 2¾ h.p. Sunbeam. I have tightened the spring on the left-hand side almost to the limit, and made various alterations of the screw on the right-hand side without making any appreciable difference. The machine has not had much use. It has only done 5,000 miles, having been stored away from the beginning of the war until last November, so it can hardly be on account of wear. I conclude that there is some other adjustment to make, but do not wish to do anything more until I hear from you. (2.) After running at 30 to 35 m.p.h. for four or five minutes it has on several occasions come to a standstill suddenly, within twenty-five to thirty-five yards, and when it does not stop dead I can always feel the engine jibbing when going past 30 m.p.h. Could this be on account of the throttle lever working back, as I found that this happened owing to the screw being loose? I am more inclined to put it down to a bad plug, and should be glad to have your advice, as good plugs are scarce here just now and very expensive.—G.G.S. (Porto).

(1.) If you have made the usual adjustments to the clutch spring and the thrust lever, we should recommend you to look for slip at the engine-shaft clutch, or shock absorber, as it is sometimes called. It is possible that the spring needs compression, or perhaps new slipping washers are required. (2.) This trouble is undoubtedly due to pre-ignition, probably caused by an unsuitable plug.

"Minerva."

Can you enlighten me on the following points? (1.) Is the Minerva motor cycle engine a twin or single? (2.) Is it a high revving engine? (3.) Are the makers still in business? (4.) What is their address (supposing they still carry on? (5.) Did they make complete machines?—J.C.L.

(1.) Several models were made, both twins and singles. (2.) No. (3.) No. (4.) The works were in Antwerp. (5.) Yes, they did market several models of complete machines.

Running on Paraffin.

Would you inform me if a 2¾ h.p. Douglas motor cycle carburetter can be adapted to take paraffin? Being outside the machine the carburetter keeps cold, and I should therefore imagine that it would need shifting in position and covering in to a certain extent.—R.N.

The carburetter in question can be adapted to take paraffin without very much difficulty. It is already fitted with a warm air intake, and we think that if you coil the fuel pipe, say, twice round the exhaust pipe the engine will continue to run on paraffin when once it has been warmed up on petrol.

Experiences Wanted.

"W.H.M." would be obliged if any reader could recommend reliable oil head and rear lights (especially the latter) for a motor cycle. He says: "After the acetylene lamps have been dimmed, according to Order, they give far less light than a decent paraffin lamp."

RECOMMENDED ROUTES.

COVENTRY TO MORECAMBE.—W.T.

Coventry, Over Whitacre, Kingsbury, along Watling Street, through Weeford, after which turn right for Lichfield, Rugeley, Weston, Stone, Pipe Gate, Woore, Nantwich, Tarporley, Warrington, Wigan, Preston, Garstang, Lancaster, Morecambe. Approximately 154 miles.

A better, though less popular, route is *vid* Manchester, as follows from Stone to Preston: Stone, Newcastle-under-Lyme, Congleton, Stockport, Manchester, Pendleton, Bolton, Belmont, Preston.

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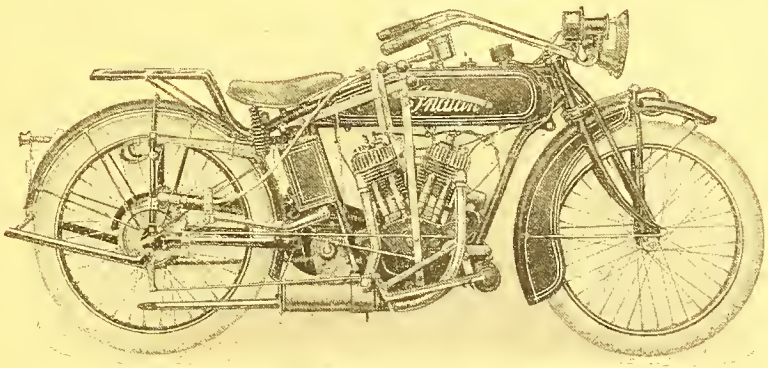
We regret that we are not in a position to supply motor cycles at the present time. But we can send a 1918 descriptive list on application. *This applies to Great Britain only.*



"Indian Motocycle" by Hendee Manufacturing Co.

HENDEE MANUFACTURING Co.,
"Indian House," 366-368, Euston Rd., London, N.W
Telephone: Museum 1613.
Telegrams: "Hendian, Eusroad, London."
AUSTRALIA—109-113, Russell St., Melbourne.
CANADIAN WORKS—12-14, Mercer St., Toronto.
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 579, West St., Durban; Indian House, Strand St., Port Elizabeth

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ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

A.B.C., 1914, in fine condition, steel cylinders, spares, lamps, etc.; £43.—Box 2,199, c/o *The Motor Cycle*. [X7203

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

A.J.S. 1915 6h.p. Combination, hood, screen, and accessories; £79/10.—Collier's Motories, Deal St., Halifax. [7489

A.J.S.—Immediate delivery of Military Model, 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

1916 2¾h.p. A.J.S., 3-speed, practically new, Lucas lamps and horn, Dunlop heavy tyres; a bargain, £45.—Box 2,203, c/o *The Motor Cycle*. [X7211

A.J.S.—We have five 1915 and 1916 A.J.S. combinations on offer. See our advertisement, page 19.—Maudes', 100, Gt. Portland St., London, W.1. [7550

A.J.S. 6h.p. Combination, 1918 model, as new, complete with spare wheel and all fittings, jack, and other parts wind screen, new last March, owner purchasing car; highest offer over £100, cost £135.—Fellows, Braintree, Essex. [7531

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4997

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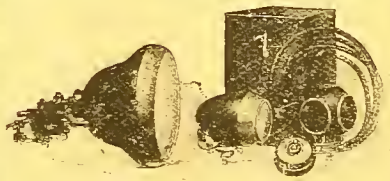

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MOTOR CYCLES FOR SALE.

Alldays.

1915 Alldays Allon, 2¾h.p., 2-speed, lamps; £25.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [C481

ALLON 2¾h.p., 2-speed, 2-stroke, hand clutch, bought new in March, done about 200 miles; bargain, 36 gns.—Box 2,202, c/o *The Motor Cycle*. [X7196

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

RIDER TROWARD and Co., 31, High St., Hampstead.—Ariel 1916 6h.p. 3-speed combination, as new; 75 gns. [7589

Arno.

ARNO, 3½h.p., good order, mag.; bargain, £10.—Cecil Holmes, Pangbourne. [7484

Bradbury.

1913 3-speed Bradbury, 4h.p.; first cheque £20.—Bassett, Doncaster. [7484

BRADBURY, 1914, 6h.p., and sidecar, £55; 1912-13 3½h.p., 3 speeds, with coach sidecar, £32/10; 1913 3½h.p., 3-speed model; £29/10.—Collier's Motories, Deal St., Halifax. [7490

Brough

1916 4¼h.p. T.T. Brough, only done 2,000 miles, very fast, perfect condition, speedometer, lamps, etc.; 49 gns.—Lieut. Lord, 1, Ovington Gardens, London. [7470

B.S.A.

B.S.A., 1916, all in perfect condition, 3-speed gear; £55.—Walbro Motors, Ely, Cambs. [7580

B.S.A. 3½h.p., F.E., best Lucas lamps, all necessories, first-class condition; £30.—A. Cook, 15, Frederick St., Grimsby. [7462

B.S.A. 4¼h.p. Motor Cycle for sale, as new, suitable for solo or sidecar work.—Apply, Tucker, Winterbourne Monkton, Swindon. [7480

1916 4¼h.p. B.S.A. Combination, chain-cum-belt, electric lighting outfit, in splendid condition; £58.—Box L6,880, c/o *The Motor Cycle*. [7456

1915 B.S.A., Model K, excellent order, very smart appearance, lamps, mirror, Lucas horn, etc.; £40.—Pearce, Westonville, Great Missenden. [X6916

B.S.A., July, 1916, and No. 1 sidecar, 4¼h.p., chain-cum-belt, 3-speed countershaft, 3,000 miles; £68.—Cooper, Newsagent, Sparkenhoe St., Leicester. [X7189

RIDER TROWARD and Co., 31, High St., Hampstead.—B.S.A., 1913, 3½h.p., 2-speed, clutch, pedal start, renovated, 29 gns.; another, similar, but not renovated, 24 gns. [7590

B.S.A. Combination, 1916, 4¼h.p., 3-speed, kick start, clutch, Stewart speedometer, 1918 power unit, fastest B.S.A. in Birmingham; £65; trials.—Call or write, Giles, Mount Terrace, Cattell Rd., Small Heath, Birmingham. [X7210

B.S.A. Combination, late 1915, 4¼h.p., 3-speed countershaft, Millford coachbuilt sidecar, C.A.V. electric lighting, Klaxon horn, speedometer, nearly new tyres, really exceptional condition; £55.—Box L6,913, c/o *The Motor Cycle*. [7564

1917 B.S.A., 4¼h.p., chain-cum-belt, and Phœnix C.B. sidecar, electric lamps, Klaxon warning signal, Stewart speedometer, 2 spare covers, and accessories, very smart lot, and in splendid condition; £60, no offers; letters for appointment.—Tidbury, Donheved Rd. N., Thornton Heath. [7467

THE MOTOR CYCLE
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AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Overloading.

A PARAGRAPH appearing in "Current Chat" in the issue of August 15th calls attention to an evil which was very prevalent before the war. Anyone who motored on the main roads outside London during week-ends was keenly alive to the fact that practically every second sidecar combination one saw was carrying at least one, if not two, more passengers than it was designed by the makers to carry. Now, this overloading cannot but do harm both to the engine and to the machine, though its cause is simply human nature. The average motorist is of a generous disposition. He is keenly enthusiastic about the pastime, and is not happy unless he can get others to share it with him. He has a powerful machine, and thinks that 8 h.p. in a light vehicle like a motor cycle should be capable of drawing along the road as many people as a 10 h.p. car, quite overlooking the nature of the vehicle he drives.

It is not only, however, the 8 h.p. combination which is made to carry more passengers than it ought, but the lightweight fares just as badly. How many times have we seen so-called featherweight sidecars attached to little two-strokes and 2¾ h.p. motor bicycles? These are essentially solo machines, and they are not intended to propel two persons; still they are asked to do this, and they do it bravely until something happens.

The manufacturer has now a problem which he will have to consider seriously after the war. He can in no wise afford to ignore this ever-increasing practice, and he has two alternatives which he can take. One is to refuse to guarantee any sidecar combination that is made to carry more than one passenger, and to refuse to guarantee any lightweight to which a sidecar is attached (which we believe has already been done); while the other alternative is to build the machines stronger so that they are capable of carrying an extra load. If this were done it would go a long way towards killing the lightweight, and would increase the weight of machines generally.

The desire for overloading is so prevalent that we came across a well-known engineer the other day who actually purchased a sidecar to fix on to a pedal cycle driven by an Auto-wheel. If Auto-wheels are asked to take sidecars, then these "new" featherweight machines, of which there seem to be a number ready to be placed on the market when the war is over, will be likewise asked to do impossibilities, and the result can only be disappointment for the user and trouble for the manufacturer.

Ton-miles per Gallon.

THE writer of an interesting letter which will be found on another page says, on the subject of ton-mileage, that speed is an expensive luxury, whether it be on a horse or a motor cycle. This is very true, and we know well that the average motor cyclist loves a bit of speed, but the superior showing of the lorry in ton-mileage does not depend on speed alone. Compared with the heavy vehicle the motor cycle is absurdly over-engined: it may have anything from 1 to 2 cubic cm. of piston displacement for every lb. of the weight of machine and rider, and consequently the engine is running most of its time on a small throttle opening. This has advantages of its own, and considerable advantages, too, but it does not tend to economy in petrol. We do not mean to suggest that, on a given motor cycle, greater economy would be attained by opening the throttle and travelling at a higher pace, for such is not the case—quite the reverse, in fact. But, if the motor cyclist were content with a smaller engine which required a change of gear on every slight up-grade and a suitable set of gears, he could show a much better result in ton-miles per gallon, though even under these circumstances we do not think he could equal the performance of a heavy lorry.

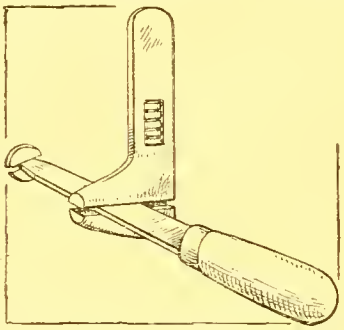
An index to the advertisements in this issue will be found on the page facing the back cover

IDEAS: Useful and Ingenious.

Readers of "The Motor Cycle" are invited to contribute to this page any ideas successfully adapted to their motor cycles. Contributions will be paid for at our usual rates. Rough sketches will suffice.

REMOVING SCREWS.

OBSTINATE screws can often be removed by using an adjustable spanner on the flat of the screwdriver, as illustrated. The turning

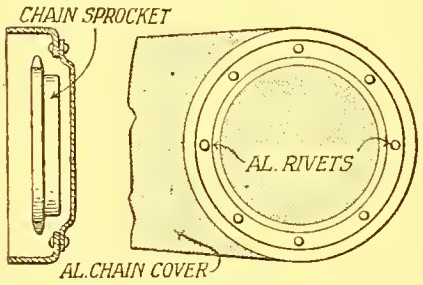


Extra leverage provided by spanner.

movement is imparted with one hand, whilst the other presses the screwdriver firmly into the screw slot. The increased leverage obtained is usually effective.

A CLUTCH COVER.

THE clutch cover on a machine fitted with a Sturmey-Archer countershaft gear was found to be loose, and was

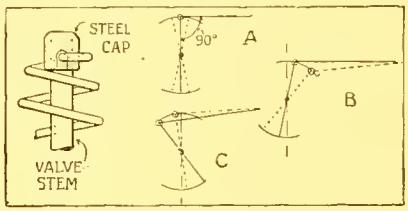


An effective, easily-made replacement.

subsequently lost. The aluminium chain case illustrated was made and fitted. For the clutch cover sheet steel of 20 s.w.g. can easily be dished on suitable hardwood forms, or the local tinsmith would do the job. The cover is riveted to the aluminium chain case. With this device the chain will keep cleaner than with the old style of cover, which allows the ingress of road dust.

OVERHEAD VALVES.

WHEN removing overhead valves, it is generally found that the ends of the valve stems are burred over by the hammering of the rocker arms, and will not pass through the valve guides unless the burred edges are first filed off. Small hardened steel caps (as illustrated) preserve the valve stems and prevent burring over. Care should be taken, however, to see that, when the valve is half open, the rocker arm is at right

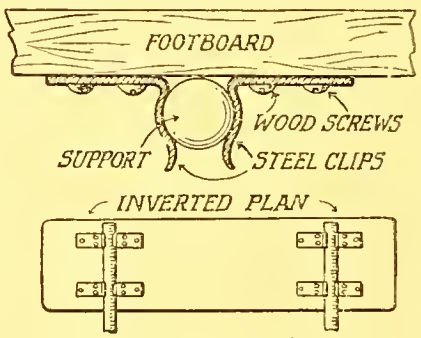


Device to prevent injury to overhead valve stems.

angles to the valve stem, fig. A. A valve adjusted as per fig. B or C sustains abnormal side thrust, and quickly becomes worn and leaky round the valve stem and guide.

FOOTBOARDS.

WOODEN footboards when attached immovably to rigid supports are often split by comparatively light accidental blows against obstacles; but if attached by spring clips, as shown, they

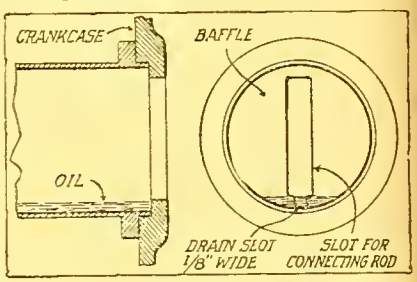


Spring method of attaching footboards.

will be driven off without splintering, or bending of the supports. The clips are 3¼in. wide of 18 s.w.g. steel, and are secured to footboard by wood screws. Colonial riders and those who often traverse rough mountain roads will appreciate this little tip

OILING FLAT TWINS.

THE rear cylinder of a flat twin is often over-oiled, despite very close baffling, while the front cylinder is starved. Cutting a drain slot in the baffle plate as indicated on sketch cured

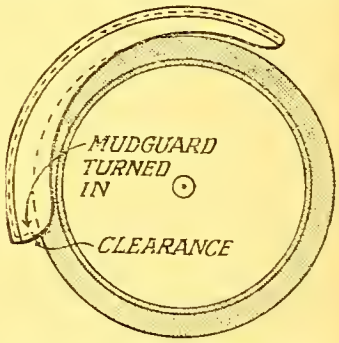


To release surplus oil from rear cylinder.

this fault on a 3½ h.p. flat twin. The slot, though too small to allow much extra oil to be splashed into the cylinder, allowed any excess to flow out. The excess had previously accumulated and caused the over-oiling.

MUDGUARDS.

TO prevent clogging with mud, the lower edge of the front mudguard is bent over to within about ⅛in of the tyre. This acts as a scraper of



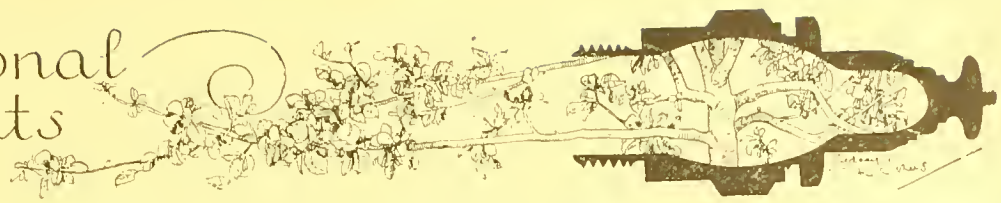
An easy method of preventing clogging.

a rattle-proof description.—E. STEVENS (Sagami).

It is strange how many capable riders rush straight at the jets as soon as they suspect carburetter trouble. Only the other day an acquaintance who thinks himself somewhat of an expert on carburation matters spent over £2 in extra jets and choke tubes and then dismantled his carburetter. After thoroughly cleaning the instrument and fitting two new jets it occurred to him to shake the float, which turned out to be about one-third full of petrol! When the leak was cured the new jets proved unsuitable, and the need for any sort of tuning disappeared!

Occasional Comments

by "Ixion"



Bad Slow Running.

IT is common knowledge that during the last year or so the staff cars of happy memory have been replaced by motor cycles and sidecars, so far as junior officers are concerned. I believe a general still enjoys a Rolls-Royce or a Crossley when journeying on his lawful occasions; a major cannot aspire above a Ford, and the humble second lieutenant must reconcile himself to what the competition programmes used to feature as a "3½ h.p. P. and M. sidecar." I have made it my business to sound these second lieutenants in some quantities as to their general impressions of the travel afforded by our first-class single-cylinder bicycles of various makes, and though youth is seldom sensitive to the refinements of locomotion, they all stigmatise the racket which a declutched motor cycle engine makes as a great blot in the design.

A Contrast.

SOME of this indictment may possibly be attributed to the drivers, who are generally "army-learnt" girls, and five or six lessons certainly cannot qualify the cleverest Wraf, Wren, or Penguin to get the best out of a combination which requires a lot of handling, especially in city traffic. But even if we are compelled to allow for driving methods which —on the average—are not those of the expert, some of the blame must go to crudeness of design. Carburetter designers employ two main methods of obtaining a good slow-running mixture, viz.:

(*a*) To concentrate gentle suction on a large jet.

(*b*) To concentrate violent suction on a small jet.

The former method has been scrapped, I believe, by every car and aircraft designer in the world, but it is still all but universal on motor cycles. Again, the car and aero throttles have adjustable stops, which are usually set so that the operator slams his lever right back when he wants the slow-running position: the average motor cycle has no simple or satisfactory adjustment of this type, so that the busy rider has to "feel" for a good slow-running position, and usually errs on the generous side to avoid stopping his engine. Car engines would not run so quietly when declutched if chauffeurs had to train their toes to "feel" for the pilot jet with their accelerator pedals.

And Yet Again—

FURTHERMORE, the slow-running mixture is invariably adjustable for *quality*, as well as for *quantity*, on a good car. The reason for this is obvious. Every motor cyclist is aware how air leaks at induction pipe joints affect the mixture, even when a 1,000 c.c. engine is running full blast on open throttle at 3,000 r.p.m. How much more must an air leak upset matters on weak suction at 200 r.p.m.? Moreover, the total area of all combined air leaks varies every time an engine is dismantled, according to the operator's success in making up the joints: and the leak total varies yet again with the age of the engine, as the valve guides, for instance, become worn. Permanent excellence of slow-running obviously demands an adjustable pilot jet. In short, the average motor cycle carburetter is devoid of every conceivable item which is essential to a nice tickover when running free

The Expense?

MANUFACTURERS will probably retort that these extra refinements are expensive. I reply that a bolt, a couple of nuts, and two or three extra operations with a drill or a tap during the machining of the carburetter body would cover the bill. I know more than one man who has made a little money by marketing slow-running attachments (for fitting to standard carburetters) at from 5s. to 10s. a time. Out of this he has had to pay for materials, tools, advertisements, and extra staff. I am afraid the truth is that, so long as a firm can sell its output, nobody worries much about these desirable little niceties of design.

Something to Puzzle Over.

HERE is a mild brain twister for the "boys" to squabble over when they sit round the camp fire (beg pardon, crouch in the mud) when their day's work is done (beg pardon again—when the sergeant is in his dug-out). The majority of aircraft engines are fitted with float feed carburetters, having vertical axes. What happens to the petrol supply when the machine is doing:

(1) A loop.

(2) A vertical bank.

(3) A roll.

Lest the fun should be spoilt oversoon, I add the warning "E.H.B." (Readers whose upbringing was simple and penurious will recall the mystic, muttered formula "F.H.B.," uttered when guests arrived unexpectedly, and there was not enough salmon or venison for everybody.) I further guard myself against swift correction at the hands of superior persons by admitting that some aero carburetters are *not* float-fed.

The Slowness of Early Quads.

"QUAD" is quite in error in supposing that I have forgotten the road qualities of the old De Dion, Ariel, and Peugeot quadricycles. When I gave 20 m.p.h. as their speed I meant their average speed in easy country. They would certainly do 30 m.p.h. on the flat when in tune, but they were apt to curl up against a head wind; one of mine once crossed Romney Marsh on continuous full throttle against the wind at rather under 10 m.p.h. At the best of times they were dreadful crawlers on grades. Such a gentle hill as Wrotham on the Maidstone road conveyed the impression that one's fair passenger could dismount, pick a posy, and catch the labouring quad up again without the need of "doubling."

HINTS ON REBUSHING.

Some Useful Information based on Experience in Handling New Bushes of the "Won't Fit" Variety.

MY recent experiences obtained during the overhaul of a twin-engine may be of help to other motor cyclists considering the undertaking of a similar job. My engine required new pistons and connecting rod bushes. In all engines of reputed British makers spare parts such as these can be obtained from the manufacturers, and this is certainly the best way of getting them.

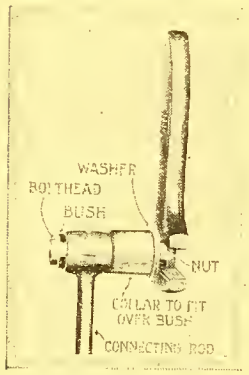
The cylinder was in good order, showing little sign of wear, and was not worn oval, therefore a standard piston with new rings (when run in) might be expected to restore to the engine its former power.

Starting with the rebushing of the connecting rods, the first operation is to withdraw the old bushes. Personally, I have the strongest objection to the use of a hammer. I never use one if I can possibly avoid it, though it is a friend in need in certain circumstances.

Extracting a Small End Bush.

An easy way of withdrawing one old bush from the connecting rod is by means of a simple bolt and nut, which should be about double the length of the bush. The method is shown in the illustration, which is really self-explanatory.

The bolt should have a head large enough to bear well on the end of the bush, but small enough to pass easily through the connecting rod. A short length of brass or steel tube of sufficient diameter for the bush to pass through completes the few items necessary. If the bush *must* be driven out, then a few hints may be of service to the comparative novice.



An efficacious method of withdrawing an old bush from the connecting rod

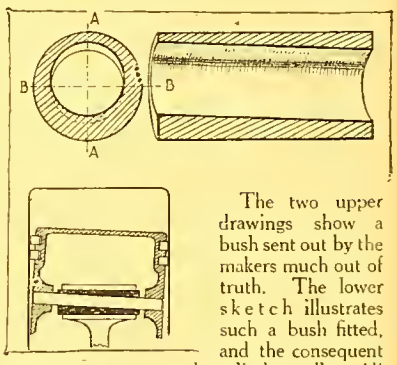
On an anvil, or some sufficiently solid support, is placed a collar, an old bush, or even a large nut which has a hole sufficiently large to allow the bush to pass, as it emerges from the connecting rod. The edge of the latter, round the bush, must have sufficient and adequate bearing whilst the driving is taking place, and an assistant to hold the rod in its place and steady it is a necessity.

Do not on any account fix the connecting rod in a vice to hold it whilst driving out the bush, because if this is done *distortion is bound* to take place. The hole may be pressed slightly oval or the rod otherwise bent, and, though imperceptible to the eye, complications and trouble will sooner or later result. For the same reason do not strike any portion of the rod with the hammer.

Having drawn the old bushes, we may now proceed to fit the new ones obtained from the makers. In very few instances will it be found that new bushes are a *perfect* fit for both connecting rods and gudgeon pin. Usually it is necessary to reduce the outside of the bush very slightly with emery cloth. Bushes are often slightly tapered, about $\frac{1}{1000}$th being the difference between the two ends of the bush. This facilitates fitting, as, if we can insert only one end of the bush into the connecting rod by pressure with the *hand*, we can take it for granted that when it is pressed into position it will be sufficiently secure to prevent any movement under working conditions.

Check the Bushes before Fitting.

Before inserting the bushes they should be examined and measured to see that the hole for the gudgeon is concentric with the outer surface. Though one would hardly think it possible, one of the two small end bushes recently supplied by the makers of my engine was at only one end out of centre, as shown in the sketch.



The two upper drawings show a bush sent out by the makers much out of truth. The lower sketch illustrates such a bush fitted, and the consequent uneven pressure on the cylinder walls. All the drawings are greatly exaggerated.

Now, it is quite apparent that, if this bush is inserted in the connecting rod with the points AA at top and bottom respectively, when the piston is fitted it will be considerably out of square, and will be bearing on the cylinder walls, as indicated in the sketch (which is, of course, exaggerated).

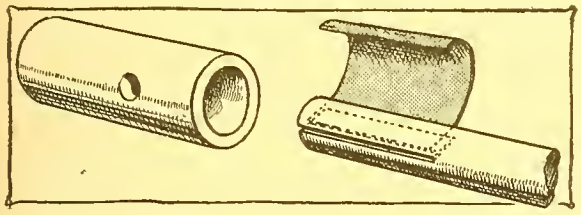
Under such running conditions the pistons will be unevenly worn, and the gudgeon pin and bush will very quickly show signs of the unequal strain put upon them. Their life will also be reduced by about 80%. Such a condition may also cause the bush to work loose in the connecting rod, resulting in the latter's becoming oval at the small end. Thus one trouble leads to another, all of which could have been avoided if in the first instance care had been exercised. It is, of course, best to scrap such a bush, but if another replacement cannot be obtained it can be used without much detriment to the engine, provided it is fitted into the connecting rod with the portion marked BB at the top and bottom.

In this position the gudgeon pin will be at right angles to the connecting rod, which is what is required. The piston will be very slightly twisted, but this is quite immaterial. Before fitting the bush to the rod

Hints on Rebushing.—

the gudgeon pin should be inserted. If too tight the bush should be carefully cleaned out with a scraper. The use of this tool requires a certain amount of skill and practical experience. An alternative is the use of fine emery cloth. Some engineers condemn the use of this for bearing surfaces, but if the surface be carefully cleaned afterwards to remove every trace of emery there should be no detrimental effect.

To increase the inside diameter of a bush obtain a perfectly round wooden rod (or iron for preference)



A simple tool by which the inside of the bush may be ground out.

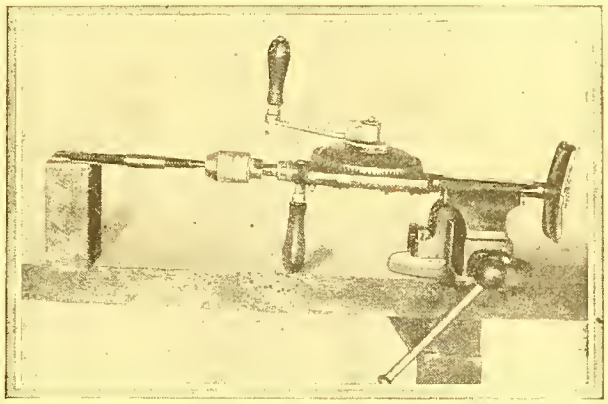
8in. to 10in. long, about $\frac{1}{16}$th less than the inside diameter of the bush. Make a fine saw cut about 2in. long in the rod centrally at one end. Cut a strip of emery cloth a little wider than the bush. Insert one end in the saw cut and wind it round the rod tightly. The length required is just sufficient to go into the bush. Do not work longitudinally, but with a circular motion, as when using a drill.

The illustration will show clearly what is required, and a good fit for the gudgeon pin can quickly be obtained. Should the outside of the bush require reducing, in the absence of a lathe it can be done very effectually with a ratchet brace if fixed in the vice and set up as indicated in the photograph. It will be necessary to obtain someone to turn the handle of the brace. The bush is forced on a wooden rod that acts as a mandrel, one end of which is inserted in the chuck of the brace, the other resting on a block of wood which acts as a steady, especially if a V groove is cut in it. A fine file, *lightly* used, or emery cloth can be used for reducing the diameter, a very slight taper at one end being an advantage.

When in position the gudgeon pin can be again tried in, and invariably it will be found that the bush has shrunk. The pin must be made quite an easy fit, at the same time showing no signs of shake or play. This should be done tentatively, the metal only being removed in places where it binds the pin. It is inadvisable to hurry this work, as the final result will greatly repay the extra labour.

Effects of Too Tight a Fit.

If the pin binds in the bush there is always a liability that it may *move in the piston*. Should this occur the holes in the piston boss will be worn oval, and this either means a new piston or reboring the holes and fitting a gudgeon pin which is not standard size. By paying careful attention to the details and the determination to stick to the moral "thorough,"



How the bush may be reduced in diameter by means of a ratchet brace fixed in a vice.

a vast amount of subsequent trouble can be avoided. In fitting the large end the same procedure should be followed, but it is hardly necessary to make the crank pin such an "easy" fit in the bush. This does not mean that less care is advocated, but that there is not the possibility of the pin revolving in the piston as is the case with the gudgeon pin.

M.

Choosing the Type of Magneto.

IN view of the number of queries we are constantly receiving regarding the kind of magneto to fit to varying types of engine, it may not be amiss to give a general idea of the principles governing the choice of magneto for the benefit of the novice.

The rule to follow in determining whether a certain magneto will suit a particular engine is to note the position of the contact breaker cams on the magneto, the angle of the engine cylinders, and the speed at which it is proposed to run the magneto. For engines having only one cylinder it is usual to fit a magneto with only one cam on the contact breaker ring and for two cylinder engines two cams. Other multi-cylinder engines necessitate a different type of magneto having a distributer attached.

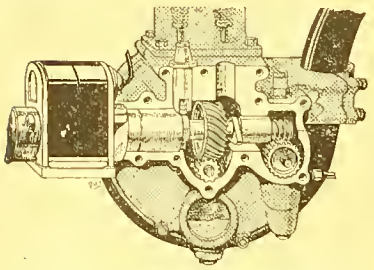
The simplest instance, of course, is that of the single-cylinder four-stroke. The cycle of the engine comprises two revolutions of the crankshaft or four strokes of the piston, one of which is the firing or impulse stroke. Therefore, we require one spark every two revolutions of the crankshaft. This is obtained by using a magneto having only one cam in the contact breaker ring and by running the armature at half the engine speed.

In the single-cylinder two-stroke, of course, there must be twice as many sparks, or one each revolution. Therefore the same magneto will serve if run at engine speed. The horizontal twins, such as the Douglas and A.B.C., require a magneto with contact breaker cams at 180°, which is run at camshaft—*i.e.*, half engine—speed.

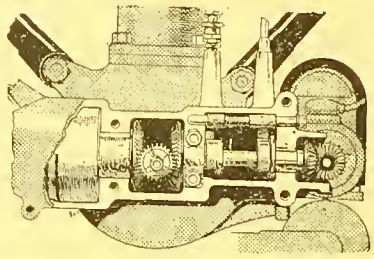
Flat twin two-strokes with single throw crank would require the same magneto run at engine speed as would vertical twin two-strokes having cranks set at 180°, similar to the Levis two-cylinder vertical model. Special magnetos are made for V twins of 42°, 45°, 50°, etc., having two contact breakers and being run at half engine speed.

CAMSHAFT OR CAM WHEEL.

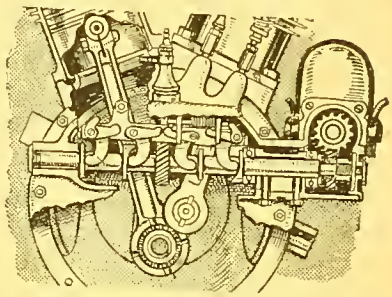
Remarks on the Advantages and Disadvantages of Shaft Drive for the Magneto.



The Puch, a continental single-cylinder design, embodying a skew gear-driven camshaft of simple design.



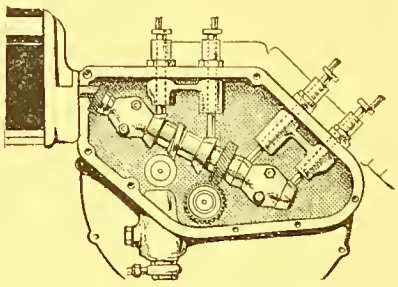
The Diamond single-cylinder engine with bevel-driven camshaft and magneto.



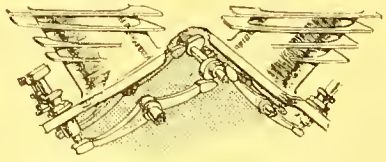
The Spacke de Luxe engine (U.S.A.), embodying a skew gear-driven camshaft and magneto.

IN the timing gear of the standardised design of the American Liberty motor cycle engine there are ten gear wheels. This means twenty bushes. The gears in this engine form two trains from the pinion on the engine-shaft—one of which drives the magneto, the other drives the dynamo. One wheel only is used in the valve mechanism.

The writer has two twin engines of the same make. One has twelve bushes in the timing gear, the other has none at all. Both are old designs, and the last-mentioned preceded the other by three years. One is constrained to ask whether designers agree that this is progress, whether the design of the future should not be as simple as possible with due regard to the owner's pocket when he is called upon to rebush this engine. I have just been quoted by the makers for a set of new bushes. The price is more than I gave for the engine. War conditions account for this, but the makers' replacement list published before the war advises me that I should have been called upon to pay approximately thirty-six shillings for the set.



The Howe skew gear-driven camshaft.



The Motosacoche 3½ h.p. twin with camshaft across the crank case.

"An Engineer's Job."

Machines continue to be designed with the magneto driven by a train of gears. We are told that it is more an "engineer's job" than driving the electrical unit by chain. Why this should be so is difficult to appreciate. What is meant by "an engineer's job"? If the chain does the same work as satisfactorily and more silently than gear wheels, surely it is a better "engineer's job" than the other method.

However, we are tied neither to gear wheels nor chains. The old twin engine to which I have referred has a camshaft running in two ball bearings driven by a single gear wheel off another half the size on the engine-shaft. The gear wheel is at one end of the shaft, and the magneto at the other. Excepting the large and small end bearings, there is not a bush in the engine, and the ball bearings on the camshaft look like wearing for its entire life. This engine has the valves inside the V between the two cylinders, as on the Enfield 2¼ h.p. twin, but in the 2¾ h.p. model the valves are placed fore and aft, and are operated by four centrally pivoted rocking levers, as on the 3½ h.p. Motosacoche engine illustrated here. It is possible, however, to embody a camshaft in both singles and twins with valves disposed on the side of the engine, and four such designs are given here.

The Matter of Silence.

In the Howe design the camshaft is carried on two plain bearings and no rockers are used; the magneto is at one end and a dynamo could be driven from the other end.

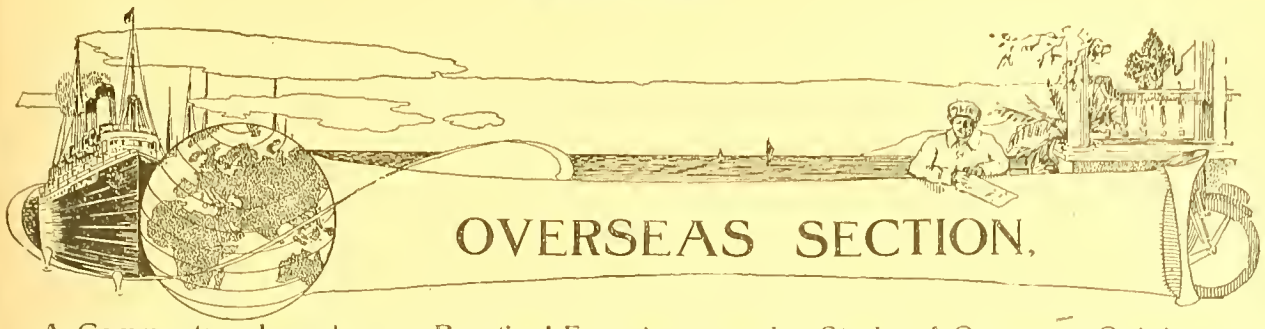
The Spacke design is more complicated and includes several rockers, but in the Puch design no rockers are used, and a pump is driven from one end.

The Diamond is one of the few British designs of single-cylinder engines embodying a camshaft, but in this case it cannot be claimed that its introduction has simplified the design.

Probably there are certain disadvantages in fixing the magneto spindle directly to the camshaft. On the old V twin to which I have referred the magneto projects from the side of the engine in a very inconvenient manner, but this disposition of the ignition unit would be an advantage if the engine were turned round for shaft drive. It will be noted that in the Diamond and Spacke designs the drive is not directly from the camshaft, but is taken at right angles through bevel and worm gearing respectively.

At the present time the majority of motor cycles are more or less noisy, and the most irritating noises emanate from the timing gear. If we get silent transmission and a properly muffled exhaust, these noises will be more apparent. At the present time certain manufacturers dare not "silence" the exhaust, because then the faults of the timing gear would offend the ear. Why not consider the camshaft and do away with spur gearing.

VEDETTE.



OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

Transporting the Wounded. A NEW YORK lady writes us accusing one of our contributors, as the result of an article which he wrote in a recent issue of this journal describing the work of sidecar ambulances, as heartless and unfeeling, on the grounds that he inferred that it is often necessary to drive the wounded at as high a speed as possible, heedless of cries from the stretcher, etc. Unfortunately this lady critic does not give her address, so that our contributor is unable to reassure her, as he would like to be able to do.

The transporting of the wounded is inevitably a cruel business, but if it were among the greater cruelties of the war there would, perhaps, be need for comment. Those who live far from the scene of fighting are apt to be too sensitive as regards human suffering. They do not realise how much of it is inevitable, or how often mercy assumes the hideous cloak of cruelty. We need only quote a single example as regards the work of the sidecars. Nineteen wounded men were to be transported by sidecar from a front line dressing station to a post accessible for the ambulance cars five miles behind the line. There were only three sidecars to do the work, and a lull in the bombardment, which could not be expected to last more than three hours, offered the opportunity. Working incessantly the sidecars accomplished the work, but only by riding at the highest speeds that prudence permitted over the shell-shattered roads. Had it not been that the riders chose to close their ears to the cries of their wounded passengers the work of mercy could not have been accomplished, and with the renewal of the barrage many of them would have perished miserably ere the sidecars could have again reached them.

Even as it was, one man, shot through the lungs, and unable to stand rapid transportation, was left till last, and the sidecar returning for him was caught in the curtain of fire. The rider, however, succeeded in gaining the post, and, though suffering from gas sickness, he conveyed the unfortunate man to safety under heavy fire. Can anyone justly describe such work as heartless and unfeeling?

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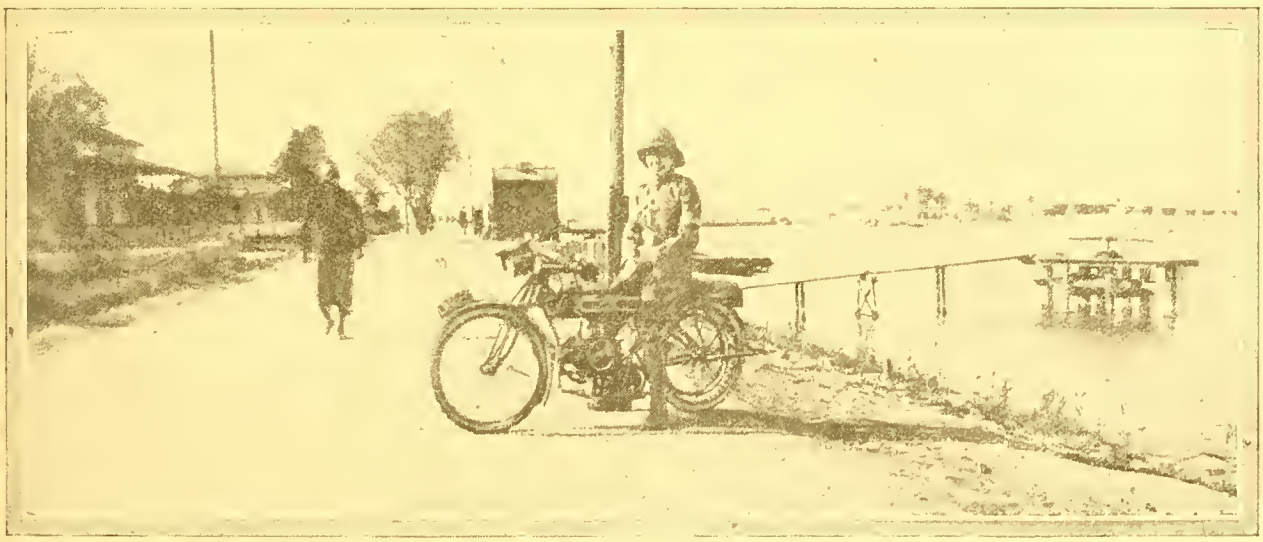
American Despatch Riders. THE American despatch riders working in France are much taken with the British machines they see, their sole detrimental comment being, "We could not do with them twiddly bits on the bars." The retort of the British rider is, "Say nothing about twiddly bits; we could not do with your bars in this country."

We have seen many American solo mounts operating in France, and have noticed that, without exception, they were equipped with extreme touring bars. Why is this? Surely the experience of British riders might have carried more weight in assisting the judgment of the American authorities! The positions the riders assumed behind these bars appeared strained and by no means conducive to good control—indeed, one American rider told us that he suffered severely with



On the banks of the Suez Canal. The ubiquitous W.D. Douglas is in evidence as usual.

Overseas Section.—

backache after only three or four miles in the battle area. The problem is all the more astonishing, since the Indian people have produced one of the most comfortable and efficient semi-T.T. bars on the road, and it can only be assumed that, contrary to the general principle of the American Army, the question of expense has been taken into account.

The American sidecars used by the great new army have one interesting, though perhaps not entirely new, feature—namely, the sidecar wheel can be aligned without disturbing the chassis. This is an excellent point, and one which British sidecar makers would do well to contemplate. Every sidecarist is familiar with the wearisome task of aligning his sidecar by judicious manipulation of the couplings, which have a knack of springing into their own approved position independent of his efforts. How much less arduous and troublesome to align the wheel simply by the adjustment of two lock nuts by the application of a single spanner—a matter of four minutes' work at the outside. Incidentally, the constant readjustment of sidecar couplings does not tend in the direction of reliability, and if the whole be adjustable it is seldom necessary to disturb the main attachments.

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Air-cooling. No intelligent rider could help but concur with "Road Rider's" commonsense views expressed some little time ago regarding the matter of air-cooling. Certain admittedly humorous gibes at his comments, or rather at his emphatic method of expression, do not leave one any the less convinced that it is time some effort was made to produce the air-cooled engine on scientific lines; and if this were done it is pretty certain that its scope of adaptability would be enormously increased. When a modern 8 h.p. air-cooled engine, with its heavy cast iron cylinder and masses of heat-retaining metal, is capable of hauling a heavy sidecar and 30 stone of passengers for six successive miles on low gear and on a gradient varying from 1 in 10 to 1 in 6 without overheating—and we know numbers of 8 h.p. J.A.P.'s which in the service of the French are doing this daily, winter and summer—it stands to sense that if "Road Rider's" suggestions were carried into practice we should have engines which could not be made to attain temperatures sufficiently high to affect their wearing properties or pulling powers.

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What is Overheating? With a modern engine the rider probably suffers no inconvenience from overheating, even amidst Overseas conditions—or rather is not conscious of the inconvenience he *does* suffer, regarding it as the ordinary state of affairs and only to be expected. That his engine has to be decarbonised every thousand miles or so, that he uses an absurd quantity of oil, that his valves require attention at regular intervals, and, finally, that his engine needs a thorough overhauling every 5,000 miles, he contemplates as the necessary evils of motor cycling, and he is quite content to put up with them because everyone else is in the same boat. With a really cool-running engine, however—one which never attained a high enough temperature to test its endurance—all these inconveniences would be very considerably reduced, and the cost of maintenance proportionately affected. Since cooling is the most important factor as concerns the maintenance and durability of the power unit, surely every step should be taken to bring about improvement in this direction. It is to be hoped some of our leading engine manufacturers will take "Road Rider's" comments as a basis on which to build, at any rate, an experimental unit. Overseas riders will appreciate it.

A Selection of Letters from Readers scattered all over the World.

Motor Cycles in Calcutta.

Mr. J. E. Peronne, A.M.I.E.E., writing from Calcutta, says: "You will no doubt be interested to hear how motor cycles are getting along in Calcutta. At present the rainy season has commenced, people thus favouring cars as far as possible. You are, of course, aware that the Indian Government has for a long time now prohibited the import of cars and motor cycles. Prices of recent model second-hand machines have consequently soared, whilst repair shops, and more especially coachbuilders, are very busy indeed. Lack of sufficient stock of steels, magnetos, and accumulators, however, at times hampers even these repairs. The war has absorbed most of our "knutty" riders, so that the most favoured types now are the lightweights (Calthorpe, Allon, Radco, Levis, etc.) and the family 'bus. As regards these sidecar machines, one does not seem to see quite so many Indians as formerly, whilst Harley-Davidsons are in demand. A 1916-17 Harley-Davidson outfit fetches about £135. So far there is practically no petrol scarcity in Calcutta, though there has been on the Bombay side and in Ceylon."

New Zealand Trade.

Mr J. A. Sims, of Dunedin, New Zealand, writes: "I am enclosing herewith an extract from a local paper showing the official return of motor cars and motor cycles registered in New Zealand for the year 1917. In view of the interest your paper is taking in the question of Overseas trade after the war, this return should be of interest to your readers.

"We have heard a lot lately in your Overseas issue about American motor cycles and the way in which they are ousting the British-made machine from the Dominions' markets. The extract I enclose shows that, although in cars this is true, in motor cycles the number registered last year of United States origin was 1,094 as against 1,668 from the United Kingdom, leaving the U.K. in the lead by some 500 odd. It would appear that, in spite of the war, Great Britain is managing to keep ahead of her rivals in the motor cycle trade."

Extract from *Otago Daily Times*, May 20th, 1918. Some interesting figures:

"During 1917, 6,679 motor cars and 2,814 motor cycles were registered in New Zealand. More than half the cars were owned in the North Island. The most striking feature of the figures is the small share of the trade in motor cars retained by the United Kingdom. The factories and workshops of the United Kingdom have concentrated attention on the production of munitions, and New Zealand money has been going to America for cars.

"The country of origin of the motor cars and motor cycles included in the total for the year is shown in the following table:

Country of Origin.	Cars.	Cycles.
United Kingdom	415	1,668
United States	4,122	1,094
Canada	1,976	—
France	104	—
Italy	14	—
Belgium	—	20
Other foreign	15	11
Origin or make unknown	33	21
Total	6,679	2,814

"During 1914 New Zealand imported 1,308 motor cars from the United States, 1,093 from the United Kingdom, 873 from Canada, and 192 from other countries. This made a total of 3,466 motor cars imported for the year. The

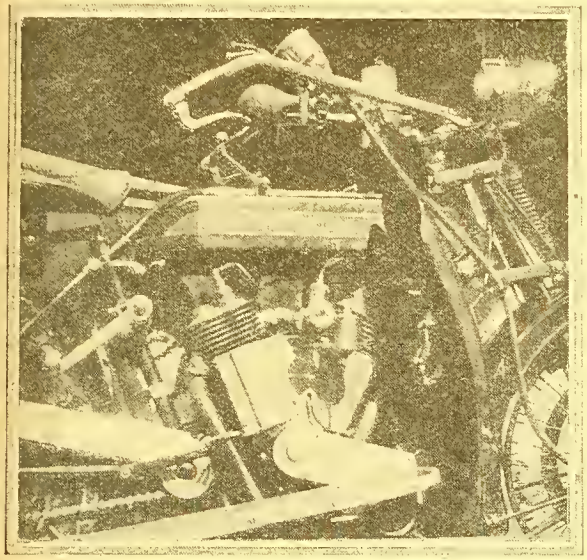
Overseas Section.—

number of cars imported last year exceeded the registrations. The number of motor vehicles imported for the first three months of 1918 was 1,171, against 1,115 in the first three months of 1917."

Mudguarding.

MR. GEO. W. MATHIESON, of Capetown, writes: "From time to time I have noticed photographs and articles on leg shields, so I am sending one I took recently.

"The shields in every instance have proved most effective. You will notice that the valve stems and tappets are enclosed in an aluminium shield, and so is the sprocket and chain of handle starter. It is hardly worth mentioning that the mount keeps wonderfully clean.



Interesting leg shields and valve cover on an Enfield.

"One point I should like to mention *re* motor cycle manufacture, and that is that all machines have their drives on the left-hand side. What a blessing it would be if they were on the right, as most heavy mounts nowadays have a sidecar attached. This is a point in favour of the Enfield. If a chain goes it is generally the rear one. This, fortunately, is on the right, and so is easier to repair. Then, again, two countershaft chains are run instead of one, so you have not much from which to choose.

"Once more the price of British and American machines arises. To purchase a 4¼ h.p. B.S.A. and sidecar, without lamps, etc., you are asked £145 10s., and yet for the same figure you can get a Harley-Davidson with electric light outfit. It is unnecessary to ask which goes first."

Experiments with Decarbonisers.

DR. WATSON writes from N.S.W. some interesting and pointed remarks on patent decarbonisers and the quality of *The Motor Cycle*: "I have been experimenting (these 'experiments' extended over six months, and in each case the makers' instructions were carefully followed) with much-advertised chemical decarbonisers (on a 500 c.c. motor cycle engine). The conclusion I have come to is that all the good done (if any) by these very expensive and largely-puffed 'nostrums' is achieved just as easily and far more cheaply by a mixture of equal parts of common methylated spirit and kerosene.

"While I regret that you have further to raise the cost of *The Motor Cycle*, I do not intend to give it up. There is no journal like it in Australia. The Australian journals devoted to motoring are simply rubbish compared with the English. The foregoing sentiment is anonymous—*very!*

"Am sending my contribution (or subscription) to London by this mail.

"Wishing you and your staff and journal every success; likewise eternal perdition to the thrice accursed Hun and all his friends, *at home* and abroad."

Good Roads in Australia.

MR. N. THOMAS, Adelaide, South Australia, writes: "I frequently notice in *The Motor Cycle* that writers from Australia try to make out that a motor cycle is used as a kind of stump-jumping aeroplane, *i.e.*, that our roads are rotten, and, incidentally, what fine nerve they have to conquer them. There are plenty of bad roads in such a tremendous junk of earth like Australia is, but there are plenty of good ones, as witness some of the record-breaking stunts that have been made. I recently rode a single gear T.T. machine on a seven hundred miles trip up north, and approximately for two hundred miles there was macadamised road, the remainder being natural; now, barring a few bad places, one could travel a whole heap. This natural track is quite good if it is not wet enough to 'pick-up' on the wheels; when that happens, it is no bong, and unrideable. When writing of the bad roads, why cannot correspondents mention that there are thousands of miles of good ones, too? And this 'special machine' talk is mostly all bunk; so far as I can judge, the trend of English design is pointing to about what will suit Australia after the war. I was pleased to see that some of those average speed fiends were bowled out. Recently I rode my 3½ h.p. modern T.T. on a 150 mile trip, and, without taking risks, I let it go, to see at what it worked out. The road was good enough, and I found I made twenty-one and a half miles an hour for the distance, and, believe me, I was 'going some' at my top to keep up this average; so when I read of fellows doing 40 m.p.h. averages I know that Ananias still exists in a camouflaged state.

"There is one fitment I would like to see scrapped, and that is the petrol tank tap. I find nearly all petrol taps leak. A better idea by far is the screw-down needle system, solidly made.

"Your paper is costing 4d. here now, but I find it cheap at the price. Good luck; hope you can keep it going O.K."

Mechanical Engine Starters.

I AM glad to announce that the high cost of electrical starters has induced several inventors to concentrate on the possibility of mechanical engine starters. The cycle car world is simmering and bubbling. Designers and manufacturers and inventors of comparatively high technical standing are evincing interest in them, largely because of the prospect that the middle classes will be impoverished for a generation or so. The starting handle is obsolescent. The electrical starter is expensive, and, in its cheaper forms, troublesome and unreliable. Consequently, mechanical starters are very much on the carpet just now. It is quite possible that this activity will react on the motor bicycle in time to come. I see no reason why the motor bicycle of the future should not have a more convenient starter mechanism than we have yet seen. Whether this is a justified hope or not, big sidecar outfits and cycle cars may certainly reckon on improvements. The present-day kick-starters will certainly start an engine: but the repeated downward and backward digs are ungraceful and laborious. We look forward to starting our engines by an action no more violent than the depression of a clutch pedal: and we shall be glad when the starter pedal is removed to a more accessible position somewhere "forrards." But we do not want, as a set-off against this advantage, another 60 or 70 lb. added to the weight of the machine.

ROAD RIDER.

CURRENT HAT

Times to Light Lamps.

SUMMER TIME.

Aug.	29th	... ...	8.24 p.m.
,,	31st	... ..	8.19 ,,
Sept	2nd	... ...	8.14 ,,
,,	4th	... ...	8.10 ,,

New R.A.F. Uniform.

It is stated that a light blue uniform has been approved for warrant officers, N.C.O.'s, and airmen of the Royal Air Force.

"Where the Petrol goes."

A writer in the lay press is much perturbed at seeing a staff officer driving a bull-pup in his sidecar, hence the heading. According to the law, however, the presence of a passenger is no evidence of illegal usage.

Promotion.

We congratulate Major A. M. Low, R.A.F., on his promotion from the rank of captain to major, to date from April 1st. Few readers of our paper are better known in the motor cycle world, and few have deserved more of their country than the gallant major, whose exceptional scientific abilities are helping to win the war.

Stolen Motor Cycle.

A 1915 B.S.A. has been missing from Grantham since May 9th last. The machine was a three-speed countershaft belt-driven model, and one of the saddle springs was broken. The petrol filler cap was replaced by a cork. B.S.A. carburetter with B. and B. float chamber, and the petrol tap under the tank. Tyres nearly new, Bates on front, Dunlop on rear. Lamp shade broken off; very wide T.T. bars. Registration No. FC 2227. Any information regarding whereabouts of this machine will be gladly received by Capt. C. A. S. Thornton, M.G.C., c/o the Editor.

How the Croix de Guerre was Won.

Recently a young American who volunteered with Danglard, formerly a French motor cycle racing man, to mend a broken telephone line at the front, had an exciting experience. Danglard was hit by a shell, a piece of which pierced his cheek, while another grazed his head and knocked him unconscious. The narrator writes: "I did not know what to do, but finally ran on, scared nearly to death, and about one hundred yards further on found the separation, joined it, and ran back to Danglard. I lifted him as gently as possible, which was quite roughly, and after an almost endless walk stumbled into our station again. Here is where the Boche helped me to win the cross. He had cut the line, and, not believing that it would yet be fixed, sent along an important piece of news. It gave our side word of their plans, and then a bit of hustling, and the French beat them."

ON THE WESTERN FRONT. A Tank crew resting after cleaning up and overhauling their "bus."

Special Features.

HINTS ON RE-BUSHING.
ADVANTAGES OF TWO SPARKS.
FLYING THE ATLANTIC.

Reunion.

The next Olympia will be the meeting house of motor cyclists at present scattered all over the world. What a reunion it will be!

Analogy.

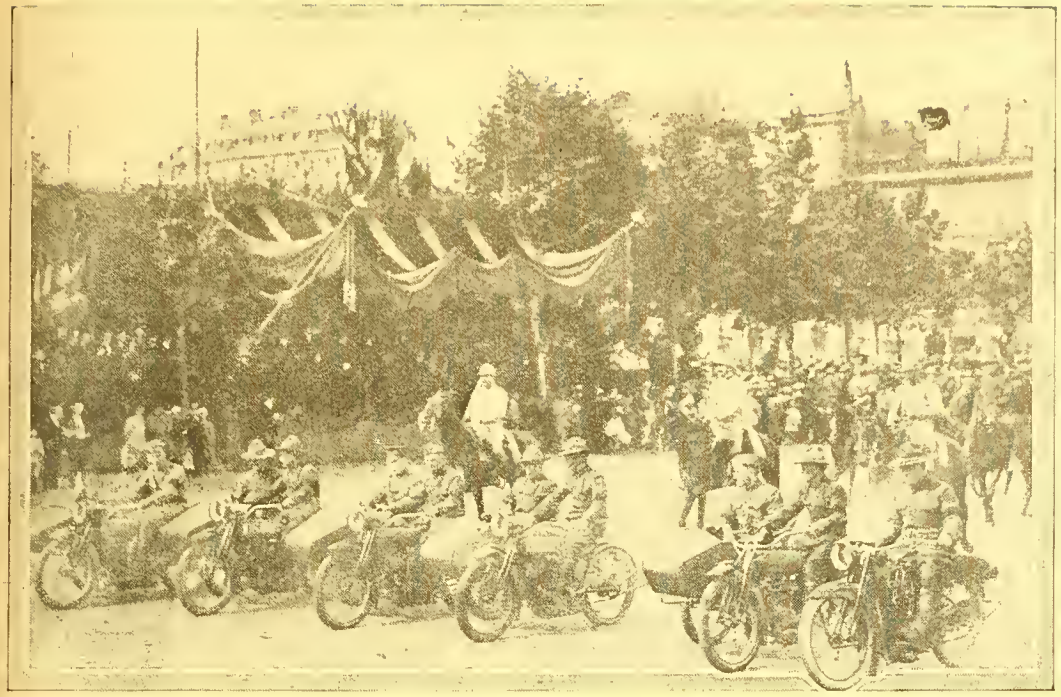
A correspondent, commenting on the state of the French roads, says: "*A propos* of pot-holes, our military road makers, when repairing these roads, do not appear to put down the same foundation as the original. Therefore, as they are mostly renewed in lateral strips, they assume, after a copious rain or two, an appearance similar to the surface of the Thames on a windy day."

An Exciting Adventure.

An American balloonist, becoming entangled in the cordage of a parachute in which he had just made a descent, was being dragged across country at a rapid rate by a high wind, when a military motor cyclist, observing his danger, rode his machine at high speed across the fields and charged into the centre of the billowing parachute, and so ended its wild career. The balloonist escaped with superficial injuries, but the motor cyclist suffered a broken arm and burns from the ignited escaping petrol.

Red—Paper.

The motor cyclists of the French Army are compelled to carry a special permit, which they call their *papier rouge*, and which is supposed to be endorsed with every run made. At any time the rider of a motor cycle is apt to be held up by the *gendarmes*, and the permit demanded. "But," a correspondent writes us, "we were informed that these papers cost the equivalent to 3d. each, and that, therefore, we must not squander them. The result is that we proceed merrily about our duties with our red permits reclining in our dug-outs; mine is now two months old, and so far I have entered up two runs. We have heard about red tape and scraps of paper, but here we have a scrap of both."



AT AN AMERICAN BASE PORT IN FRANCE.

American sidecars passing the review stand during the parade of French and American troops on Bastille Day.

Luxury.

According to the Luxury Tax, a motor cycle costing under £50 is good enough for business purposes. From our experience, only the best is good enough for the business man, who has no time for tinkering.

Brakes.

It is perhaps unfortunate that most of our motor cycle manufacturers are located in a comparatively flat part of the country. Had the motor cycle industry taken form in a hilly district, there is no doubt that better braking systems would have been evolved ere this. One manufacturer advises us that during his recent holiday he discovered an ideal testing ground for his post-war model in the West of England, where he claims to have discovered some new test hills for post-war trials.

Motor Cyclist Ambulance Drivers Wanted.

We have heard from the British Ambulance Committee, Service de Santé Militaire, 23a, Bruton Street, London, W.1, that motor cyclists are wanted to drive motor cycle ambulances in the Vosges.

At the request of the French Army the committee is extending the sidecar ambulance service in the Vosges mountains, and is urgently in need of another twenty motor cyclists. Men over the age of forty-one or who are Grade 2 over thirty-five are required. A knowledge of French is of assistance, but not absolutely necessary.

The work, as our readers are aware, is most interesting, being in advanced posts in the mountains, and has been graphically described recently in articles sent by "Chinook," one of our staff, who for some time has been doing excellent work with the French Army in the Vosges.

The pay is £2 a week, while uniform, travelling expenses, and rations are provided. Application should be made to Mr. B. Peyman, Vice-president of the British Ambulance Committee, at the address given.

Imports and Exports for July.

The Board of Trade returns for July compared with July last year show a decrease of £1,414 on imports, and a decrease of £6,453 on exports of motor cycles and parts.

IMPORTS FOR JULY.

1918.	Value of motor cycles and parts ..	£171
1917.	" " ..	£1,585

EXPORTS FOR JULY.

1918.	Value of motor cycles and parts ..	£66,984
1917.	" " ..	£73,437

The Industrial Reconstruction Council.

An important series of conferences and discussions is announced by the Industrial Reconstruction Council to be held at 6 p.m. in the Hall of the Institute of Journalists at fortnightly intervals, alternately with the lectures at the Saddlers' Hall, of which particulars have already been published. The first of these will be opened by Mr. Robert Wilson, of the Ministry of Labour, on Tuesday, September 10th, with an address on "Works Committees." On September 24th the subject will be "Trade Boards," and the speaker Mr. J. J. Mallon, of the Anti-sweating League. The other conferences will deal in turn with "Interim Industrial Reconstruction Committees," "The Place of Conciliation and Arbitration in the Whitley Scheme," "Women in Industry," "The Trade Union of the Future," "Functions of Industrial Councils," and "Restriction of Output." No tickets will be issued, but all those who intend to be present are asked kindly to inform the Secretary, I.R.C., 2 and 4, Tudor Street, E.C.4, who will be glad to send a full prospectus of the series on application.

Second-hand Shows.

The "second-hand" shows died a natural death. Will they be revived after the war?

Another "Hot Air" Yarn.

A correspondent writes: "A chum of mine who rides a Triumph was stopped by one of the Lisburn police sergeants, who demanded his petrol licence, etc. The rider thought he would pull the sergeant's leg a bit, and told him he was driving on hot air, which was not restricted. He got off without any further trouble, and the bobby made tracks for the nearest repair shop (Jos. Fletcher's), to find out particulars. Needless to say, he did not get much correct information."

The Motor Cycle Maid.

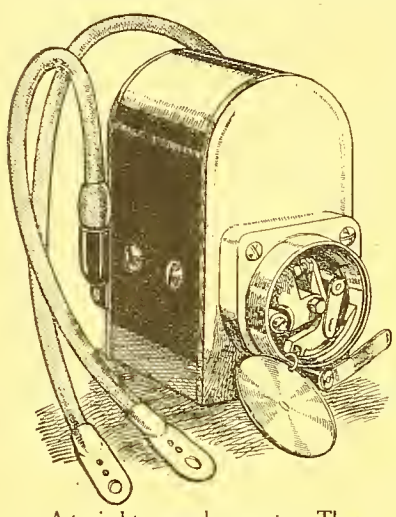
For all the charms of the King's highway and the undoubted rhythm of speed, there has been little enough verse devoted to our pastime since Henley's "Song of Speed." A poet with a more perceptive vision has tuned his lyre for us at last, and we give below one verse from the rather charming "Artemis in London" of Mr. Wilfred Blair:

In many forms, in many forms, these new heroic days,
Has Artemis come down to us—in virginal brave ways.
But oh, the motor cycle maid, with lithe, straight back thru low,
Slim outspread arms, wind-braving breast, and the fair, keen face aglow!—
As she leans thrumming down Whitehall or on to th' Embankment swings,
I see the Wingéd Victory, whose fluttered garment clings
About her splendid, urgent limbs, her poise superb with speed—
I see the inviolate Maid,
Buskined and unafraid,
Spear-armed, spear-eager, lead the hunt where'er the hunt may lead.

The Advantage of Two Sparks.

A Road Experience proving that a Two-stroke Engine benefited more than a Four-stroke.

SOME little time ago I was able to conduct various ignition experiments—not on the bench, since the necessary machinery was lacking, but on the road—with a two-spark magneto, that is, a magneto by means of which two sparking plugs, each having its separate and individual circuit, can be used in each cylinder. The final decision arrived at was that with a four-stroke engine no material advantage was gained by igniting the charge at two points—in fact, it made no perceptible difference of any kind to the running, whereas with a two-stroke the results obtained with the two plugs, one placed at the side of the cylinder and the other at the top, were quite different from the results obtained with the one plug. To begin with, the explosions were more instantaneous, and therefore the engine was capable of attaining a much higher rate of revolution, though it was prone to knock on the slightest provocation. I should imagine that a low compression two-stroke, having two points of ignition, would be highly efficient in every way, not only as regards speed, but also as regards fuel consumption. With my two-stroke the compression was too high to obtain really advantageous results, and when running on a heavy fuel, which naturally gives a more rapid explosion than petrol, the knock was very pronounced. The fuel consumption, however, was better than when a single-spark only was used.

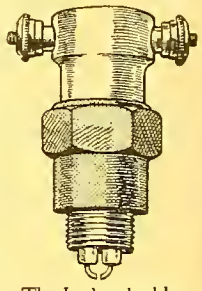


A typical two-spark magneto. There is practically no external difference from a twin magneto, but the armature and connections are constructed to give two sparks simultaneously.

The Double-pole Plug System.

Personally, I rather fail to see the object of a two-spark magneto, which is not the most reliable of instruments, when double-pole plugs are to be obtained. It would seem that some real advantage is to be gleaned with the latter over and above those of igniting a diluted charge at two points, and therefore making sure of the proper combustion of a weak or impure charge. For, with the two-pole plug, one obtains an intensely hot spark, which burns the plug points clean, and therefore the system should be specially adapted for trial in some of the oily flat twin engines. It would be exceedingly interesting to hear the results of any trials motor cyclists may have made with two-pole plugs, as it would appear to be a system well worth trying in two-stroke or very oily engines. I imagine that an ordinary two-stroke, prone to all the weaknesses of its tribe, would be enormously improved if two plugs in series were used—not only as regards speed and fuel consumption, but, further, as regards steady pulling at low speeds. My own limited and somewhat hasty experiments lead me to think that the carburetted charges a two-stroke inhales benefit by two points of ignition, and that the two-pole system with a single-spark magneto would score in many ways over the two-spark magneto system—used, our readers will recall, on one or two Scott machines in the last T.T.

H.B.



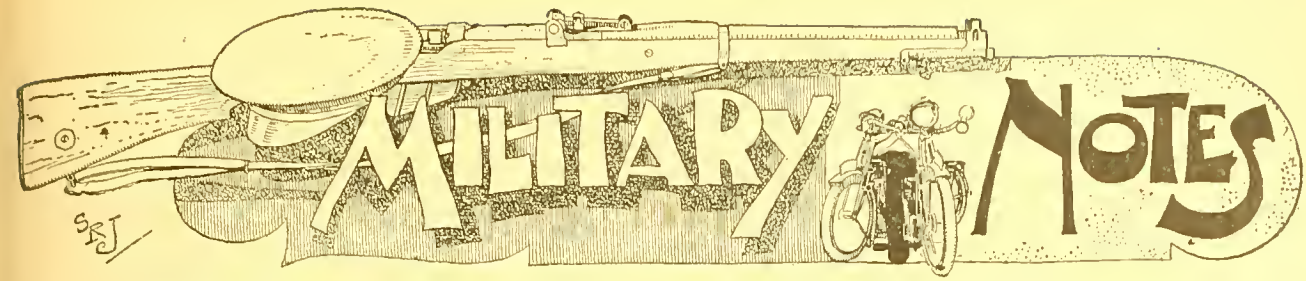
The Lodge double-pole plug

INCREASING THE BRITISH EXPORT TRADE.

WE have already given particulars of Sir Charles Mandleberg's scheme for the development of British export trade after the war by means of co-operative effort on the part of non-competitive firms. It will be remembered that the underlying idea of the scheme is that firms—probably firms who have not previously exploited foreign markets—should co-operate in the maintenance of representatives abroad in markets that give promise of useful and profitable development.

The idea has met with a far more encouraging reception than is usually accorded to such schemes, and Sir Charles is now in a position to publish the names of some 250 firms who have promised their support to the scheme when the time comes, and also have incidentally confessed their faith in the future possibilities of hitherto unexplored markets. Besides the firms whose names are contained in the published list, many others have manifested a lively interest, and are most probably only waiting for a lead—which is now given them—before they definitely commit themselves to the policy of support.

We may remind our readers that the scheme involves the subscription by the members of about £100 per annum (the amount is not yet definitely decided upon), and in return they will have the benefit of a representative always on the spot, ready to act on their behalf in any matter that may crop up. More than one enquirer has asked why such a plan should prove better than the schemes it is known the Government have in hand for the development of Overseas trade, but the answer is really simple, and is only necessary on account of a certain amount of misconception that exists as to the real nature of the suggested Government schemes. The Government has so far only suggested schemes for discovering markets. It is the object of the present scheme not only to discover the market but also to capture it.



Suggested Improvements in Design. Home Service D.R.'s and Pensions.

MENTIONED IN DESPATCHES.

TEMP.-MAJ. A. J. PALMER, of the Tank Corps, has again been mentioned in connection with valuable services rendered. This is the second time he has been specially mentioned in twelve months. Maj. A. J. Palmer before the war was in the financial department of *The Motor Cycle*.

SOUTH AFRICAN D.R.'s.

LT.-GEN. SIR J. L. VAN DEVENTER, K.C.B., commanding the British Forces in East Africa, mentions in his despatches the following names of South African motor cyclists in the South African Signal Service: South African Motor Despatch Rider Company—Sgt. S. O. J. Forsberg, Pte. J. M. Killian, Pte. C. Knox, Cpl. T. F. E. Reynolds, and Pte. (Act.-Cpl.) C. M. Young. South African Motor Cyclists Corps—Sgt. F. E. Walker.

"THE NEW ZEALAND CANNIBALS."

A D.R. with the New Zealand Div. Signal Co. in France writes: "I read your excellent paper with interest, and some of your correspondents' opinions with amusement, so I am sending a photograph taken over here a few weeks ago of my machine—a 4 h.p. W.D. Triumph. There are various alterations and gadgets which may appeal to some of your readers, also to D.R.'s out here.

A D.R. attached to the New Zealand Div. Signal Co. in France. He has fitted several useful improvements to his W.D. Triumph.

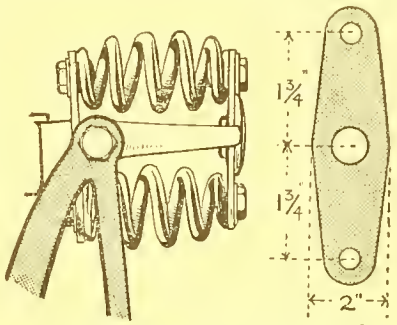
"By the way, I am an Infantry Brigade despatch rider of the N.Z. Div. Signal Co., N.Z.E.F., France, and now in action. You will probably have seen us referred to by the Germans as 'the New Zealand Cannibals' and headlines to that effect in your papers.

"You will understand that these improvements have undergone a strenuous test, as the motor cycle is exactly seven months old to-day. Note the following: Flat rear mudguard with wide wings. Mudguard 7½in. wide. Front mudguard 7in. wide. 'Kiwi' for mascot. Discs on wheel bearings (stationary) to keep mud out. Waterproof (sheet tin) magneto cover. Foot-controlled clutch operated by brake pedal on footrest bolt. Aluminium valve guard. Extra fins on cylinder to deaden cylinder ring. Brass air intake on carburetter. Gear box quadrant cover. Long exhaust pipe, 1⅞in. diameter, with exhaust whistle brazed on, and operated by throttle in exhaust pipe and one in the bottom of whistle, controlled by Bowden wire control to front brake lifter on handlebars (very efficient, too).

"*Re* the kick starter arguments. It is worthy of note that none of the D.R.'s have any complaints about kick starters. Why? From personal experience here, I may say that kick starters on Sturmey-Archer gear boxes cause no trouble whatever, with the exception of the renewal of a kick starter pawl in about six months. This is only half an hour's work. We use the starter day in and day out, and have no complaints. Why? We expect our motors to start first kick, and they do.

"Now for a bit of a 'grouse.' We certainly do *want* 28in. wheels, wider hubs, bigger tyres, and more efficient spring forks; also stronger rims. The M-L magneto leaves nothing to be desired, being, in my opinion, the most efficient magneto on the market, including the Bosch. Likewise the S.A. gear box, which is very reliable. Frames require to be stronger, and the present-day steering columns are only a bit better than a military push bicycle. One of your correspondents wrote a really good article on that a few weeks ago. They are far too flimsy at present: any rider over this side will tell you the same.

"At the present moment I am trying out another gadget, which so far is very satisfactory. It has two head springs in place of one. There are two plates of spring steel, obtained from an old French car spring in this village, and the springs are bolted to each as shown. The distance from the centres is 3½in. The front plate is on the front or outside of the existing stirrup or bridle, which makes the angle of the forks the same as previously. Spring breakages are far too frequent with us, owing to the nature of the roads here."



A pair of head springs fitted to the Triumph fork in place of the original single spring.

LONG-SERVICE MEN.

WE hear that W. A. Davenport (several years with Messrs. Lea-Francis, Ltd.) and "Rover" Nobel have just been granted commissions. Both have recently returned from long service Overseas. Davenport was among the first twenty-five men recruited by *The Motor Cycle* for the original No. 5 Battery of the M.M.G.S.

A DESPATCH RIDER'S PENSION.

THE question as to whether or not a military motor cyclist was on duty when he met with an accident was decided upon at the Pensions Appeal Tribunal. H. Carter, forty-one, was on duty on August 4th, 1917, when, as a despatch rider in the R.F.C., his machine skidded on Putney Bridge on his way from Farnborough to Canning Town, with the result that his leg was broken in six places. Carter admitted that he had been granted a short week-end leave, and intended to go on to his home in East Ham, but said he had been told to get some motor cycle fittings in Canning Town on the way. It was decided that he was on duty at the actual time of the accident, and his claim was therefore allowed.

The Three-jet Binks Carburetter.

Some Notes by a Confirmed User.

PERHAPS the following notes on this much-discussed instrument may be of some interest. I plead guilty to having been a confirmed user for the last four years, and, to me, its greatest interest lies in the wonderful variation in power output that it is capable of effecting. A secondary interest of vital importance to-day is its economy.

The Binks carburetter differs considerably from standard motor cycle types. To begin with it is more solidly made than usual, and the arrangement of the extra air intake in front of the throttle barrel stamps it as unconventional

The float chamber follows standard practice, and has bottom petrol feed and a neat bayonet jointed cover. Access to the interior of the float chamber is a matter of seconds.

From the float chamber the petrol is taken to a reservoir beneath the three jets, where it is filtered before passing to the jets.

I should like to see another large size filter fitted below the float chamber *in addition*—a purely theoretical improvement, I must admit, because a choked Binks jet, even size No. 00 pilot, has been *a very rare occurrence* in my experience. The throttle barrel and arrangement of the three jets form the heart of the instrument, and a very sensitive heart it is.

The throttle piston is a solid brass cylinder carrying at its lower end jet dampers to prevent petrol wastage, and is drilled horizontally to provide choke tubes for the pilot and second jets. The three jets are arranged to form a triangle. Looking into the instrument from the main air intake the pilot jet is the middle one nearest the observer. No. 2 is to the right-hand, and No. 3 (the main jet) is on the left-hand.

The Phases.

Let us now consider the functioning of this carburetter and compare it with that of the more conventional type. We will suppose that the carburetter is attached to a single-cylinder engine, because this type of engine demonstrates most clearly its one serious fault.

Mr. Binks, I believe, has dubbed his instrument "a three-phase" carburetter. Personally, I should say it exhibits three and a half phases, and until the objectionable extra half phase is eliminated people will experience difficulty with his carburetter.

No. 1 phase is provided by the pilot jet being brought into operation by the initial movement of the throttle piston. This movement lifts the solid pilot jet damper off the jet top and brings the correct pilot choke into operation. With a normal size pilot jet fitted, say, 00 or 0, this provides the engine with a small quantity of approximately correct firing mixture, and enables the engine to start very easily.

Further movement of the throttle ushers in phase No. 2, in precisely the same way as No. 1 came in.

The throttle movement lifts the spring damper off the second jet as the corresponding choke tube for this jet comes into line with its spraying orifice.

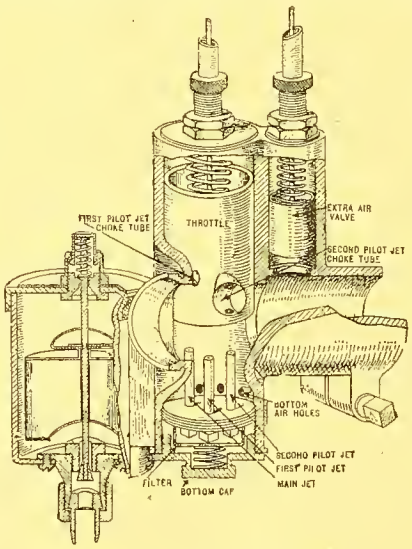
Now the engine is being fed with mixture from two fairly small jets *viâ* two approximately correct choke tubes. The quantity of the mixture has increased, but the quality (or petrol vapour to air ratio) has remained much the same (again presuming a normal jet setting). For all normal running in level country the two phases Nos. 1 and 2 supply sufficient power, and few people experience any trouble in finding the correct setting for pilot and second jets.

Further throttle movement brings us to the crux of the trouble some people have experienced, which I have dubbed the "extra half phase."

Theoretically, the throttle opens further, uncovering the hitherto damped out third jet, bringing all three jets into operation in a varying choke provided by the upward movement of the throttle piston.

A Hiatus.

At this point I regret to say I am not in agreement with Mr. Binks. Our disagreement centres round what happens at the point when the throttle has just



Sectional view of the Binks three-jet carburetter.

opened on to the main or third jet. On a single-cylinder engine, if the machine is speeded up to, say, 24-26 m.p.h. on pilot and second jets, and then the throttle opened to the stage in question, the engine ceases to fire momentarily, and will certainly stop if the throttle is not brought back on to pilot and second, or opened right up well on to the three jets.

I have attributed this "hiatus" to the fact that at this stage, when the third jet has just been uncovered and is coming into operation, the choke area provided by the ascending throttle piston is inadequate for the mixture requirements of the engine. The engine cannot fire the over-rich mixture supplied, and hence the firing hiatus that has puzzled a number of people. To my mind, this theory is supported by the fact that if the throttle is pushed more widely open, thus largely increasing the choke area, the acceleration of the machine is simply wonderful. I have tried every possible combination of jet setting on singles and twins, two and four-stroke, and I have not yet managed to eliminate the firing pause between second and main jet. Once one learns to use the carburetter, it is easy to mark the "dead" spot on the top of the handle-bar control; and when it becomes necessary to use the full throttle, speed up on pilot and second and open the throttle lever past the dead spot. There will then result an acceleration that will satisfy anyone, especially if the user will remember that his throttle control provides a variable choke tube in addition to its more apparent function.

In practice, I prefer the carburetter as a two-lever instrument, and always set it as such, although it is capable of wonderful automaticity. Especially is this marked on the Scott machine—a machine which the Binks carburetter suits better than any other.

Starting difficulties with this carburetter are rare if the user can resist the temptation to flood the carburetter, and does not use too large a pilot jet. Owing to the small choke area on the pilot jet, a flooding carburetter soon fills the cylinder with a very rich, badly vaporised mixture, and starting difficulty follows as a result. The remedy is to *close the throttle, open the extra air,* and scavenge the cylinder by trying to start with only the extra air open. Then a fresh attempt, without flooding, and utilising only phase No. 1, will generally be successful.

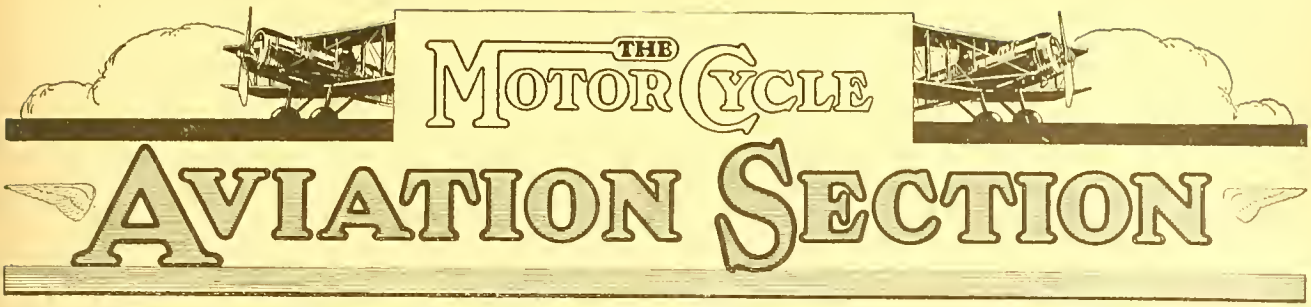
Economical Running.

On the road, in open country I find I can set the Binks control levers to give a good road speed and maximum economy simultaneously. I attain the road speed I desire by using both throttle and extra air levers—say 26-28 m.p.h. Then little by little I cut down the throttle allowance, leaving the extra air well open. As long as the speed can be kept nearly constant the engine can be persuaded to run on the merest whiff of mixture largely adulterated with extra air. Any reduction in speed, however, spoils the setting, and the performance has to be repeated after the road is clear again. The setting of the bottom air is regulated by the metal clip on the throttle body. I confess to removing it before fitting the instrument, as I find it makes very little difference to the starting or to the running.

Jet sizes are a matter for individual experiment: and as two identical engines may vary quite a lot, it is impossible to give any advice on the matter.

To summarise, it is a fine carburetter, capable of marked economy in fuel, and giving good flexibility and engine control; but in my opinion it requires some design alteration to eliminate the "dead spot" already referred to.

ALEXANDER LINDSAY, M.B.



Over Four Thousand Hun Planes Down. Capt. R. L. Keller, R.A F., Killed.

U.S.A. "R.A.F." Staff Officers to Learn to Fly.

Plans are afoot in Washington requiring all officers at the "operating end" in administrative and staff work of the flying branches of the Service to learn to fly. The plan does not include officers of the aircraft production division.

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War.

The "infinite variety" of the goddess Bellona may be judged from the materials employed in her service. These include antimony for hardening leaden bullets, nitric acid and iron disulphide for explosives, magnesium for smoke shells, mica for gas masks, mercury for detonators, and platinum in unheard of quantities.

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Belgian Rulers Fly over Channel.

King Albert and Queen Elizabeth recently flew over the Channel from Belginm to England. This is the first time in history that any ruler has ever made a flight from one country to another. The Royal couple travelled in separate seaplanes, each operated by a Belgian Army aviator.

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British Aviators down 4,102 Enemy Aircraft in Twelve Months.

During the year ending June 30th, 1918, British airmen and anti-aircraft guns have accounted for 4,102 enemy aeroplanes. On the Western Front the R.A.F. destroyed 2,150 planes; 1,083 were driven down out of control. The R.A.F. units, working with Naval airmen, shot down 623 enemy aircraft. In other theatres of war 246 enemy aircraft were accounted for.

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The Late Baron von Richthofen.

In view of the correspondence appearing in *The Motor Cycle* concerning "Richthofen's Diary," the following extract from "My Adventures in the Flying Corps," by the late Maj. J. T. B. McCudden, V.C., D.S.O., M.M., M.C., appearing in the *Evening News*, is interesting.

Maj. McCudden describes how a dinner was held to celebrate the winning of the second bar to his M.C., and to others who had received awards in the wing. One of the officers who had received an honour made a speech, in the course of which he asked all those present "to rise to drink to von Richthofen, 'our most worthy enemy,' which toast we all drank with the exception of one non-flying officer, who remained seated, and said, 'No, I won't drink to the health of that devil.'"

A Poet and Airman.

Maj. Gabriell d'Annunzio, the famous Italian poet and airman, has carried out quite a remarkable feat of war. He led a squadron of eight aeroplanes right into the heart of Austria. Even in peace-time this would have been a great flight—seven hundred miles there and back in 6h. 35m., at an average height of just over 6,000 feet. His goal was Vienna, and on his arrival propaganda pamphlets were dropped in the district, also a vigorous little address signed by the poet himself. All but one of the eight Italian machines came back safely.

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A Well-known Airman-Motor-Cyclist.

The death was announced quite recently of Capt. Roderick Leopold Keller, age 23, R.A.F., through an accident to his aeroplane while flying over a Hertfordshire aerodrome. R. L. Keller was one of those fine sportsmen which the movement can ill afford to lose. He was trials hon. sec. to the Public Schools M.C.C., and in the early days he rode a light blue enamelled 3½ h.p. T.T. Triumph, on which he had many successes. He was a daring and skilful rider, of the type which makes the best pilot, the life and soul of the merry little club of which he was a member, and extremely popular with all with whom he came in contact.

Previous to the war the P.S.M.C.C., who were always to the fore in devising unconventional and sporting competitions, inaugurated a "Follow my Leader" run. In taking part in this Keller indulged in a miniature T.T., which, according to the report of the event, rather worried the other competitors, and caused P. C. D. Douglass to take the ditch while negotiating a right-hand corner. On that occasion he was riding a Douglas, but later on in the year he acquired a 500 c.c. A.B.C., and won thereon a race at Brooklands for his school (Rugby), and in the subsequent team race made the fastest time, though he did not bring the Rugby team home to victory, as they were beaten by one mark.

At the very outset of war he joined a Warwickshire Artillery Battery, and was mentioned in despatches Later on he joined the R.A.F.

In addition to poor Keller, the P.S.M.C.C. committee have lost the following members: C. Q. Roberts (R.F.A.), killed on the Western Front; W. C. Tallboys-Getting, missing after crossing Fosse 8; and P. C. D. Douglass, R.N.V.R., killed at sea.

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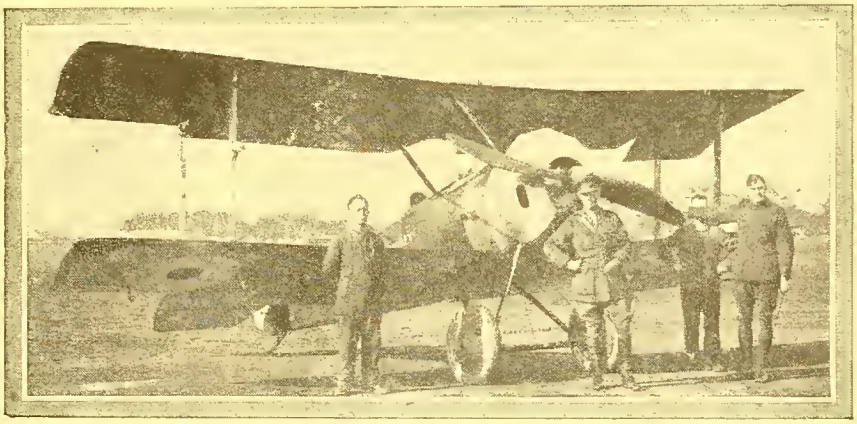
Propellers.

Henry Woodhouse, author of "Textbook of Military Aeronautics" (U.S.A.), says: "The four-bladed propeller is generally used instead of the three, because of its simpler and stronger construction features. The two-bladed propeller is more efficient than the three or four, and would always be used if the arrangement of planes and engine permitted.

"Four-bladed propellers are more efficient than two-bladed when the motor is running throttled down, at low speed.

"The three-bladed propeller has been tried repeatedly, and has proven satisfactory in some cases. But the construction does not permit continuity, each blade being a separate piece.



The late Captain R. L. Keller, R.A.F., hon. trials secretary the Public Schools M.C.C., beside his favourite 'bus. He was accidentally killed at a Hertfordshire aerodrome while testing a new machine.

The Running of Aero-Engines

HOW STARTING DIFFICULTIES MAY BE OVERCOME.

SUCCESSFUL running of an aeroplane engine is mainly a matter of experience on the part of the pilot, but a very great deal depends on simple deduction and logical reasoning.

On trouble arising with an aeroplane engine take careful note of how the engine fails; that is to say, whether it fails suddenly or gradually "peters out," accompanied by "popping" in the carburetter or misfiring on one or all cylinders. A skilful pilot will generally locate the cause of the trouble immediately, but the following notes on this subject may be of interest.

Starting Up an Engine before a Flight.

Before a pilot proceeds on a flight he should always make sure that his engine is running properly before leaving the ground. The engine should be turned over and careful note should be taken of the valves to see that they are not sticking. This is a prevalent fault in aero engines on account of the high running speeds and consequent quantity of lubricating oil used. Valve sticking is especially noticeable in the case of rotary engines using castor oil which in the winter time may often have to be thinned down with methylated spirit, but the quantity of spirit should never exceed half a pint to the gallon.

WATER-COOLING.—In water-cooled engines the pilot should always see, before starting upon a flight, that the circulation is in order. About 2% expansion should be allowed for the water when hot.

All engines require "priming" before starting up, and this is done, in the case of the stationary engine, by turning the propeller round, thereby sucking fresh charges of explosive mixture into the cylinders, and in the case of the rotary engine by doping each cylinder in turn with a petrol squirt. The method of turning the engine over in the case of the rotary engine is not practicable owing to the mixture having to pass through the crank case, which owing to its volume would waste not only time but petrol. On some engines is fitted a priming pump which sprays petrol into the induction pipes before starting up.

Having carefully inspected the engine all over and primed the cylinders, the engine is started by one or other of the following methods. (Different methods are employed on different classes of engines.)

1. Swinging the propeller. Rotary engines are always started in this way, and most low-powered stationary engines.
2. Hand-driven starting magnetos.
3. Mechanical hand-starting gear. (This is sometimes used on one type of rotary engine which is the only exception to 1 above.)
4. A combination of 2 and 3.
5. Compressed air starters.

Considering all the above methods of starting in order as above.

PROPELLER SWINGING.—This requires very careful practice, and it is dangerous for a mechanic to attempt to start up a high-powered rotary engine unless he has had some previous experience. We will presume that the mechanic has already primed the engine and is ready to start it up. He first pulls the propeller over until he gets one cylinder nearly on compression, and the propeller, whether a two or four-blader, in an easy position for swinging over. Having done this he stands clear for a second and calls "contact"—the action of standing clear ensures safety should the engine, particularly if it is warm, start-up immediately the pilot switches on. The pilot having switched on and repeated the word "con-

Notes on the Running of Aero Engines.

tact," the mechanic grips the propeller, and having made sure that he has a perfectly sound footing, pulls the engine over. In damp weather the ground is likely to get slippery where the engines are continually being started up, and it is advisable to have a plentiful supply of sawdust always at hand.

HAND-STARTING MAGNETO.—The procedure is as above, but upon the mechanic giving the word "Contact" he remains standing clear whilst the pilot turns the handle of the starting magneto. The mechanic should not approach the propeller again until the pilot distinctly calls out "Switch off."

MECHANICAL HAND-STARTING GEAR.—The cylinders are charged by turning the engine with the hand gear. While the engine is being turned over as fast as possible by this means, the switch is put "On" (*i.e.*, in the "contact" position), and at the same time the starting handle is thrown out of gear.

MECHANICAL HAND-STARTER, WITH STARTING MAGNETO.—Practically the same as above, but the starting magneto is geared to the starting handle, and it is switched on when the cylinders have been charged as above. The pilot in this case does not rely upon the engine magneto, as it would not give such a hot spark at the low revolving speed of the engine.

COMPRESSED AIR.—*Two* methods: (1) Air is either supplied to a small motor which revolves the engine, or (2) air is supplied at high pressure to each of the cylinders of the engine in turn. This is done through a distributing valve operated by the camshaft.

FAILURE OF ENGINE TO START can be due to: (1.) Lack of vigour in swinging propeller. (2.) Incorrect throttle adjustment—bad mixture. (3.) Engine out of order.

Dealing with (1), as already stated, the swinging of propellers requires careful practice. To start an average engine, the propeller must be swung smartly and at a reasonable speed. If the air is cold and the engine is stubborn, propeller-swinging is very quickly exhausting work.

Checking over a Bad Starter.

(2.) All engines have their little peculiarities, and note should be taken of any particular throttle adjustment necessary when starting up. If the carburetter has a "slow running" adjustment, start with the throttle quite closed, otherwise from one-quarter to one-third open is sufficient. In winter time trouble is very often experienced in "starting up," but this is generally due to the cold atmosphere producing only partial vaporisation of the petrol. In warm weather, on the other hand, there is generally a tendency to get too rich a mixture into the cylinders. Should an engine fail to start for this latter reason, turn the engine backwards one or two revolutions in order that the mixture may be weakened by the additional influx of pure air drawn in through the exhaust valves.

(3.) Engine out of order. If, after all the above points have been noted, it still refuses to start, it is obvious that there must be something wrong with the engine itself; but before the machine is wheeled back to the hangars for the engine to be consigned to the repair shop, it is always well thoroughly to trace the ignition system from the plugs to the distributer to ascertain if the cause of the trouble lies here. Failing this, look for leaking or sticking valves or possible air leaks in the induction pipes. Finally, the timing should be carefully checked.

G. H. BETTINSON.

"WINGED WARFARE."

REVIEWED BY "TORQUE."

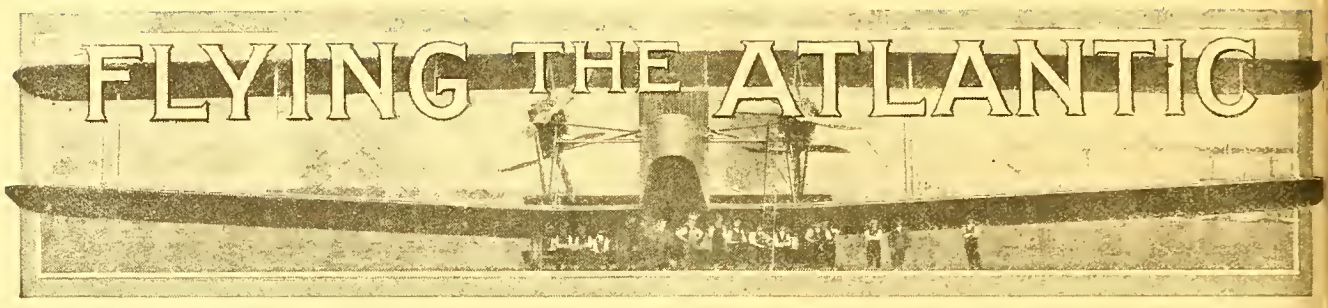
WITHOUT hesitation I recommend Major Bishop's book to all interested students of war flying as by far and away the best book on scout fighting which has yet appeared in any language. It is very rarely that a man with Major Bishop's genius for action is also blessed with real literary gifts and with the analytic powers required to give an intelligent account of his own success.

The book has three main interests. The first is the breath-catching excitement of the tense adventures it describes. Fancy going out alone, cold and hungry, at three o'clock on a dark morning to raid a sleeping Hun aerodrome twelve miles over the lines. Major Bishop's account of his efforts to do as much damage as possible whilst preventing the Hun machines from getting up to attack him is superb.

Secondly, the book reveals most accurately a fighting pilot's growing mastery of tactics, as experience teaches him the wiles of the Hun and the risks of certain situations. As a tyro Major Bishop went bald-headed at any and every Hun he sighted. By the end of the book he has adopted much the same attitude as is displayed in Richthofen's diary. There is nothing fine in sacrificing your life uselessly.

Thirdly, the book betrays Major Bishop's struggle with himself. Nobody can attain his position without a degree of coolness and presence of mind seldom encountered. But the author confesses repeatedly that in his earlier days he was always liable to sudden fits of anger or excitement which led to impulsive action, and repeatedly came near costing him his life. Little by little he schooled himself to control these weaknesses, and at last he is able to say: "I was firmly resolved that, having got so far in the game and past its most dangerous stages, I would take no foolish risks, but continue to wait for the best opportunities.

Incidentally, the book is full of excellent yarns. The palm may be given to two. One day Bishop saw his squadron quietly cruising home alone after a patrol, and at rather a low altitude. Four Huns, lurking in the clouds, were ignorant of the presence of Bishop's formation, and were preparing to do in his unconscious commander. Bishop hesitated whether to ward off the intended attack, but finally waited until his unhappy C.O. was fighting for his life, and then shot down two of the four Huns. The other story is an instance of supreme gallantry. Bishop himself was hotly attacked by superior numbers, and a brother officer, both of whose guns were jammed, came to his assistance with a bluff attack, and enabled Bishop to extricate himself. Fancy plunging into a dog fight without being able to fire a single round!



Forty Army Aviators ask Permission to be in the First Fleet to Cross the Ocean.

FORTY American aviators of the First Provisional Wings unit at the Army aviation field at Mineola, rated as the best trained pilots in service in U.S.A., have presented to their commanding officer a petition requesting that they be selected to fly the first fleet of American-built Caproni or Handley-Page bombing machines across the Atlantic under the plans proposed by the makers of both types of aeroplanes.

In addressing the aviators upon their proposal, Major C. K. Rhinehardt, commanding officer of the aviation field, said that he believed that the plan of flying aeroplanes from America to Europe was feasible, and he added that he believed the flight would be undertaken before the end of the year in planes built in America and equipped with the Liberty motor. He told them that he wished to make the flight himself, and that he was desirous to have his name added to the list of Americans volunteering for service in the first Overseas squadron. It is probable that the petition, with the approval of the commanding officers of the field, and with their names added, will be forwarded to the War Department.

Most of the men who volunteered for the flight have received training in the flying of the huge American-built Caproni and similar machines here, and officers at the field said that the men were qualified to fly that type of aeroplane. Under orders they are continuing their study of the Caproni planes here, and it was announced also that a detachment of the men had been sent to the flying field of the Standard Aircraft Corporation at Elizabeth, N.J., to study there the mechanism and flying qualities of the giant Handley-Page aeroplane.

This machine has a wing spread of 100ft., and is propelled by two Liberty motors of 400 h.p. each. Lord Semphill and other expert British pilots will show the Americans every trick of the huge machine, and every pilot will make flights in it or in other planes of the type. All of the pilots in the First Provisional Wings will rotate in studying this plane and the Caproni at the Army field here.

Major Rhinehardt and other officers at the field said they were sure that the flight would be undertaken within a few months, and that some of the machines in the first fleet would be flown by American aviators, although Italian, French, and British aviators attached to the field here are anxious to pilot one of the first planes. He said that the American Army officers favoured the route from Newfoundland to Ireland, instead of flying to the Front by way of the Azores and Portugal. The Americans wish to fly the planes from the factories to Newfoundland, and then make the jump of 1,860 miles to Ireland, and thence to the Front. They have suggested also that a string of ships be placed at 200-mile intervals along the route, so that the pilots would be guided accurately in their swift flight and have facilities to repair their planes in case of accidents.

Before his death Sgt. Gianfelice Gino, the Italian pilot who was instructing Americans in the flying of the big Capronis, asserted repeatedly that he concurred in the opinion of the late Capt. Resnati and other pilots that the flight across the ocean could be made, and that no better men for the undertaking could be found than the experienced pilots at the field here with the young Americans who have become expert fliers under their instruction.

The forty pilots in the First Provisional Wings who have volunteered for the flight have all taken long cross-country flights, have been in the air a greater number of hours than have other pilots, and have become expert in the flying of battle and reconnaissance planes, as well as the big Caproni bombing planes.

In sending their petition, the Wings said that their request did not lessen their desire to pilot battle planes at the Front, and that they were anxious to see service over the lines if it is decided that they have acquired the proficiency in the handling of the bombing planes necessary for the Atlantic flight. Many of them are pilots who have been withheld from Overseas service, however, because they had qualities needed for the experimental work with the bombing planes. —*Aerial Age Weekly* (New York).

BRITISH OPINION ON THE ATLANTIC FLIGHT.

Mr. Claude Johnson, general managing director of the Rolls-Royce, said in the *Daily Mail* last week: "I am much interested in the suggestion made by certain manufacturers that some form of fifteen hours' elimination test for aeroplanes should be held, with a view to determining what machines should be entered for the *Daily Mail* Transatlantic flight.

"It is to be hoped that the Government will allow a public competition to show that there are several engines which could fly non-stop for fifteen hours or more. I can quite understand that the fighting forces are jealous of sparing a single machine for a single hour under present conditions. I question, however, whether sufficient attention has been given to the effect on the enemy of such a demonstration. Already the bombing of the Rhine towns is forcing the Frankfort financier to leave his home and to live farther eastward. The demonstration would bring fear to his heart because it would show that his new home is still unsafe.

"The demonstration would make the Berliner tremble in his shoes, and could not fail to have a demoralising effect throughout Germany. It would also prove that in the near future aeroplanes made in America will be flown across the Atlantic instead of occupying shipping tonnage.

"I think the test should be of more than fifteen hours' duration. At the end of fifteen hours a landing might be allowed for replenishment of fuel and change of pilots, but the machine should be permitted to fly indefinitely to prove to the enemy that on the arrival by air at the Front of the planes from America they will be in a position immediately to fight, and could easily visit Berlin, drop bombs there, and return to our Front and continue fighting before overhaul for repairs would be necessary."

Flight Over Sea likely this Year.

Joseph Handley-Page, the manufacturer of the famous bombing aeroplane that bears his name, is of the opinion that the $50,000 prize for a flight across the Atlantic may be won this year. In an interview in the *Daily Mail* he says:

"I am certain the flight could be made, given our present machines as developed by the war and the experience in flying of our military and naval forces, were we not kept so busy manufacturing aeroplanes for war purposes.

"All aeroplanes nowadays are coming toward France, not going away from it. One of our Handley-Page machines made in America would not be materially damaged or its fighting value impaired by making the flight from America. All things considered, the flight should be made and the prize won in 1918."

PRO·PATRIA·

III - THE DESPERADO

"One wonders at length whether they are human beings, such as one sees in the daylight hours—this listless, silent multitude, trudging ceaselessly by, men obsessed with but one desire, to cast off their packs and sleep."

IT is Relief Night. and this means that the narrow highway which runs here just behind the trenches will be crammed from the fall of darkness till daybreak—crammed with company after company of muddy, weary infantrymen, intercepted by independent little machine gun companies; crammed with men who trudge silently and doggedly on through the darkness, with no knowledge as to where they are going or when they will get there. There is no laughter, no chattering, no glimmer of light. Troop after troop, column after column, they trudge noiselessly by, like ghost companies of ghostly men in the deceptive gloom. One wonders at length whether they are human beings, such as one sees in the daylight hours—this listless, silent multitude, trudging ceaselessly by, men obsessed with but one desire, to cast off their packs and sleep.

Here, on the way, there is a tiny glimmer of light. It is a French *poste de réconfort*—a small dugout with a single bench and a huge wood stove, on which rest cauldrons of tea. Here the men can stop for refreshment. Here each side of the narrow road is piled high with dunnage rifles, machine guns, infantry men's packs, and all the formidable impedimenta of fighting men. Over and above the dunnage are the men themselves. Some stand in little silent groups, others squat on their packs, the rest are scattered about anywhere and anyhow—some lying, some reclining, others propped up against the camouflage. But all are silent. What conversation exists is carried on in hushed whispers.

The *poste de réconfort* is full and overflowing. Many are waiting at the door, and all the time the ghost companies are marching by. It is of no use calling a halt when the place is already crowded, but longing glances are cast towards the little dimly-lighted room by those who go on—and still on!

The Stragglers.

It is Relief Night, as I say, and a typical one at that. The rain descends in closely-packed clouds of heavy vapour. It beats under our helmets into our eyes, it drives into our ears, up our sleeves, down our necks, so that, added to the tramp, tramp of passing feet, there is the ceaseless drip-drip of saturation. The road is a veritable quagmire, the grit covers us from head to foot—is even between our teeth. For the sidecars Relief Night is generally a strenuous affair—especially when raw troops are involved. There are a hundred ways in which accidents occur—there are a hundred wrongs and but one right. To begin with, the Boche is pretty active on Relief Nights, and has the range of our roads to a nicety. Three shells drop in quick succession where they are least expected, then silence. The ghost companies halt and don their masks and trudge on, but stretcher bearers remain behind. Then there are the stragglers who have lost their companies, and wander aimlessly from one difficulty to another. Their name is legion. Some have hands and clothing torn by the wire, and when questioned they burst forth into a profusion of oaths with incoherent sentences strung between. They explain at length just why and where it happened, emphasising each sentence with strings of utterly futile blasphemies, and in the end it amounts to nothing. All they know is their names, their companies and their divisions, and this information they rattle off with soldier-like promptitude—glad to tell you something they *do* know. Any other question leaves them dazed. These are the new men who have never been up to the trenches before, who have never been under shell-fire before, and to whom war is a perspective even more grim than the reality. But they have youth in their favour—youth and magnificence of stature and the power of quick recovery.

Through Darkness and Driving Rain.

It is these dazed and tired men who keep the sidecars busy. If there is a communication trench anywhere one or two of them will contrive to fall into it. The automatic pistol is one of the safest weapons, but always it occasions one or two accidents—especially in bad weather. Then every division has its bad men—desperate and lawless characters some of them, who contrive somehow to get drunk on the way up to the trenches and who proceed to remain so. They are the deliberate malingerers, and usually they are the most fruitful source of trouble.

But the man we had to take out was not a malingerer. He was our own camp cook. Since dusk the Boche had been bombarding the camp intermittently, and near midnight we got the order to turn out and stand by our machines. For an hour we waited in the rain, watching the passing multitude, directing, advising. Then when the bombardment had abated somewhat, the little procession one learns to know so well, marching methodically and in step, bearing the stretcher shoulder high, loomed through the gloom.

It is nerve-trying work through the darkness and driving rain. Here there are shell holes in the road, there shattered trees and branches bar the way. But these things remain where they are—it is the things that move when not expected to move, and which do not move when desired, that "put the wind up" one when one is responsible for a wounded man. The tired infantry simply will not get out of the way, and though

Pro Patria.—

they see the motor cycle they seem incapable of seeing the sidecar, and will walk straight into it though you yell at them in full throttle. It is with a sigh of relief, therefore, that we leave the main route behind and branch off on to a byway.

Here we venture to switch on a tiny electric lamp down by the front wheel to enable us to see the shell holes, but scarcely have we done so when—"'Olt!"

The bellowing roar issues from the blackness somewhere ahead, and we stop almost dead. It is strange, for never before have we known a sentry posted here. A figure swings out of the darkness; we see a khaki uniform and the familiar steel helmet as worn by the British. "'Olt—the word?"

A "Hold Up."

This man is not a sentry. We do not know who he is. For all we can say he may be a Boche, and anyway the password is not for him. But he is crouching before us like a panther, his rifle trained, so we judge, about midship of our tunic, and his whole attitude tells us that on the slightest provocation he will fire.

"This is the ambulance, sonny. There's a wounded man on that stretcher, and we're taking him out."

The khaki figure totters aside and waves us to pass. We do so, glad to get away from him, and he bellows to us to go faster or he will give us a ding-dong bullet.

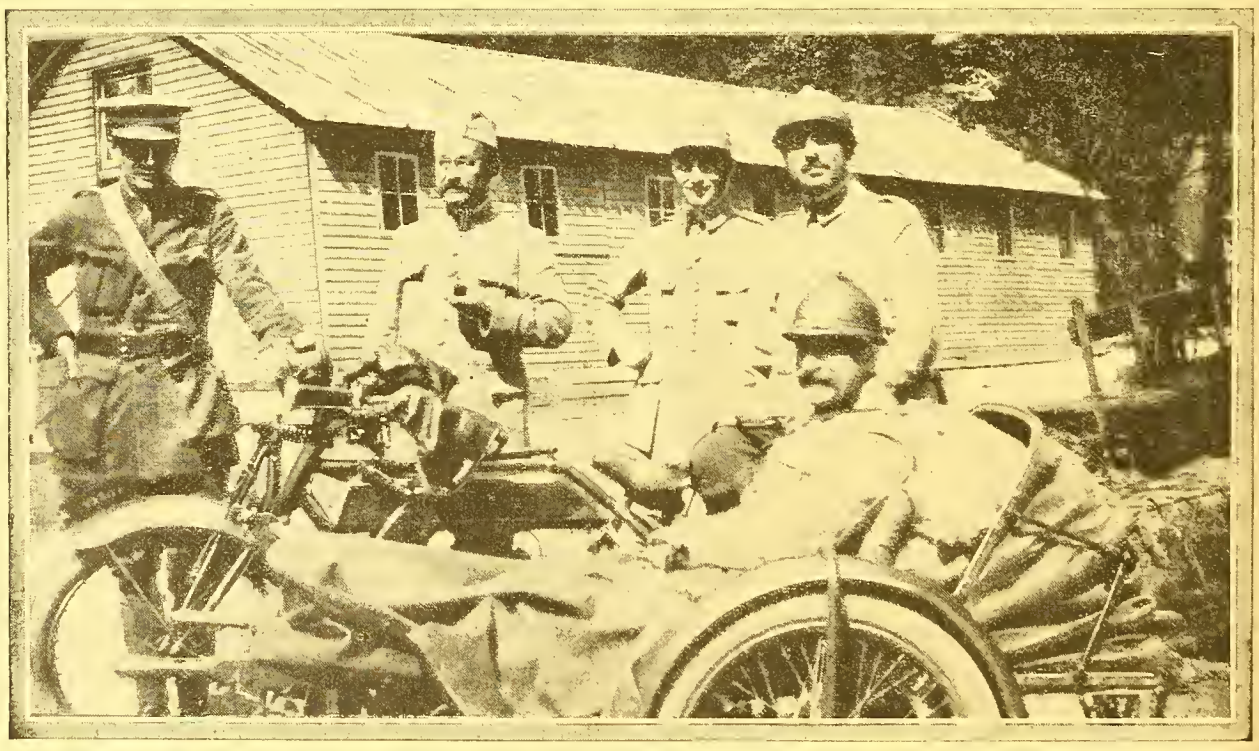
A hundred yards further on we meet a machine gun company with a boy lieutenant in charge, and we tell him to look out for one of his men on the road, who is fighting drunk and dangerous. He answers with a cheery "Right-O!" and tramps on.

It is a serious thing to hold up and threaten an ambulance without cause, and we report it to the French doctor. His quiet reply is, "Well, you know what to do, shoot him; make no bones about it—just shoot him!"

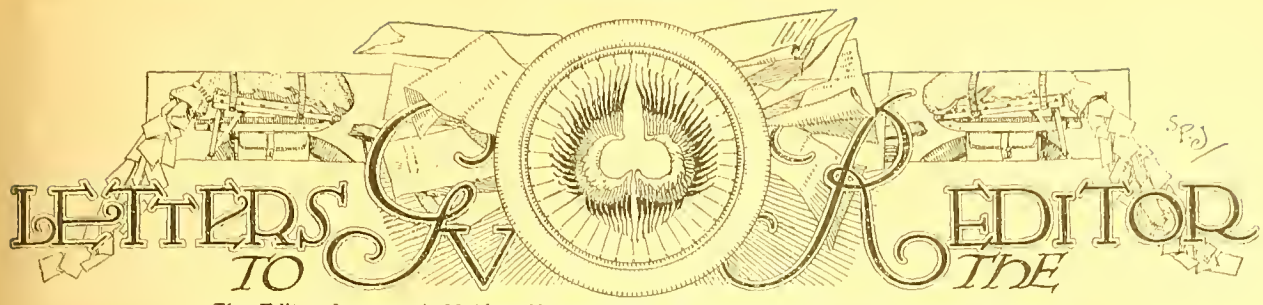
But there is no need. Reaching the same spot on the return journey we find the other sidecar in attendance, while amidst a little tragic circle a dresser is kneeling in the centre of the road over our desperado—shot through both legs, and now yelling oaths and blasphemies on the whole of creation. He had tried to hold up the boy lieutenant, even firing at him, with the result that one pistol shot had occurred. Then the boy lieutenant and his company had marched on, leaving the desperado in the gutter—just as one would cut a sapling from the path and thrust it aside.

I say that every division has its bad men. This one, even as he lay wounded, fired at everyone who passed till he was too weak to fire longer. We learnt later that he had already spent eight years in a penitentiary, and was known as a bad and desperate character.

Such men are not much use out of the firing line, but in it they are great. The trouble lies in getting them there. Once there they fight with reckless and devilish bravery, for they value their own lives no more than the lives of others. One thing the war will do—it will clean the nations of their flotsam and jetsam, putting them to good use, which could never be done in civil life. But one will remember Desperado Bill, too weak to light a cigarette, yelling unspeakable blasphemies upon the dresser, and calling for his rifle to "shoot up the whole show" as he lay in a pool of his own life's blood. CHINOOK.



The French doctors are proud of their sidecars and of the valuable work they perform, and here two high medical officers are posing for the camera. The sidecar having delivered its wounded passenger at the base, is off back to the line, and the officers, on their round of inspection, are taking advantage of the vehicle to convey them to the trenches.



The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

HOW IS IT DONE?

Sir,—I had a considerable surprise last week, and am somewhat curious to know upon what grounds petrol permits are granted.

As a cycle dealer I was refused a petrol permit for business purposes. A friend who is a motor dealer was also refused one, and probably hosts of loyal British subjects have been refused. Now, a German piano tuner called at my shop to have his motor adjusted. I asked how he managed to get a permit. He said on business grounds, and was then going to tune a piano. Perhaps this is work of national importance, but it seems grossly unfair to loyal British subjects. T. HUBBARD.

BENZOLE AFTER THE WAR.

Sir,—I have been much interested in some editorial remarks in *The Motor Cycle* on the subject of ensuring a supply of benzole after the war. The idea of getting pledges from motorists to use a certain quantity of benzole at a certain price seems a good one, if enough pledges can be obtained. I would suggest that this should not be left to the motoring organisations. The motoring press is much more likely to be able to work the scheme. Why should not *The Motor Cycle* and its allied journals take the matter in hand, and publish forms of pledge for their readers to fill in and send to them? The forms should be republished weekly as long as they produce an adequate return of pledges.

May I also suggest that some of the letters you publish from various kinds of Service motor cyclists, criticising those whom they imagine to hold softer jobs than their own, are not very dignified? P. A. LEWIS (CAPT. R.E.).
B.E.F.

[We are considering our correspondent's suggestion.—ED.]

HOME-MADE DECOMPRESSORS.

Sir,—I have not seen your paper for some time, but last week saw, in the issue of the 8th inst., an item which interested me, notably "A Simple Home-made Decompressor."

Having had great difficulty in starting a 3½ h.p. fixed gear machine of well-known make (T.T. model) owing to high compression, the back wheel skidding when exhaust is released, I tried to obtain a decompressor, but was unable to do so.

My compression tap being of usual pattern, concave at top, it was impossible to alter it as shown in the illustration (also probably insufficient clearance for removal of compression tap so fitted), so I fitted similar arrangement in exhaust valve cap, excepting that I omitted to fit a tap. As a result, I was able to start the machine, but if the fitment is retained a tap will have to be added.

In this connection, I should like to know if any of your readers have found the "Euk" easy starter of real value in regard to starting a machine such as I have mentioned.

The "easy starting tip" does not seem applicable to my B. and B., this having a gauze air intake. Unfortunately, however, I have lost the illustration given, so I am not sure as to this.

By the by, I think it would be interesting to your readers if some of them would give their experiences in regard to running down cases. I mention this as few seem to be aware of the law as to "Crown exemption." This applies also to Army officers.

About a year ago I was run down by an Army ambulance, and, as a result, was laid up for nearly three months, the machine also being badly damaged. The War Department, after holding an enquiry, stated that their driver was not to blame, and also pleaded "Crown exemption." Eventually, however, they compensated me to some extent as an "act of grace." I may add that, in my opinion, the driver was certainly to blame for the mishap.

A RIDER FROM 1876 TO DATE.

THE FIRST SPIRAL NOSE DIVE.

Sir,—The Avro monoplane, illustrated in your issue of the 8th inst., is rather interesting in view of articles in recent issues of *The Motor Cycle* on stunt flying, it being the first machine to perform a spiral nose dive and come out of it intact. This statement, by the way, contradicts an assertion made in one of the first-mentioned articles. Anyhow, the stunt occurred, I think, in 1911 at Upavon, the pilot being Lt. Parke, with a passenger up. From what I can recollect of the account given at the time, the following is a rough version of the occurrence: Lt. Parke, diving on a left-hand turn, overbanked somewhat, and sought to correct the altitude of the machine by "rudder-ing" inwards; the plane immediately commenced a nose dive, the altitude at the time being, I believe, 1,000 feet. The elevator was said to have been neutral throughout. The passenger shot forward off his seat, the rudder bar preventing the pilot from doing likewise. The pilot was, however, conscious of centrifugal force, in that he had to steady his position by catching hold of a fuselage rib. As a last resource the rudder was put hard over in the opposite direction—*i.e.*, turning outwards—when the machine immediately, not to say suddenly, flattened out fifty feet from the ground. The incident caused no little comment at the time in flying circles. The design was, I believe, recognised as faulty on account of the excessive forward side area.

The machine was available as either monoplane or biplane. I mention the matter as it may interest other readers.

Wishing your paper the usual luck, A.R

FRENCH ROADS

Sir,—I have noted the remarks made by "Tampion" *re* French *pavé* roads, which are, to put it gently, somewhat misleading.

Having traversed—during my two years' riding in France—most of the numerous varieties of French roads, I should like to remark that the *pavé* is undoubtedly the worst.

The average road of this type is usually from ten to fifteen yards wide, with a strip of *pavé* (six to eight yards) in the centre, each side of which is made up with metal, which is worn down very soon by heavy and slow-moving traffic, which, as the rule of the road requires, keeps to the side. The metal, of course, is worn away first, and especially in wet weather, when it is constantly churned up by horse transport and marching infantry, and thus the *pavé* in some cases is left four inches above the metal. The junctions of metal and *pavé* are invariably allowed to remain thus as a constant menace to D.R.'s who have frequently to pass from one side of the road to the other through traffic.

Finally, *apropos* of pot-holes, our military road makers when repairing these roads do not appear to put down the same foundation as the original. Therefore, as they are mostly renewed in lateral strips, they assume, after a copious rain or two, an appearance similar to the surface of the Thames on a windy day. R. E. ANDREWS.
B.E.F.

BRITISH V. AMERICAN MOTOR CYCLES.

Sir,—Having owned some thirteen British machines before investing in an American make, viz., an Indian, I feel my views on the above subject may be of value both to readers of *The Motor Cycle* and, may I venture to think, to the manufacturers. "S.A.E.'s" remark at the end of his letter in your issue of July 18th seems to me to be in some way wanting. I would therefore ask "S.A.E." kindly to let us have the benefit of his *considerable experience* of American machines. I consider that the outstanding advantages of American motor cycles lie undoubtedly in the provision of large wheels and tyres, spring frames, grip controls, mechanical oiling, all-chain drive, and automatic carburetters. As regards comfort on long journeys—giving credit where credit is due—I must place the American machines a long way to the fore. So long as there are men like "S.A.E.," who are satisfied with the somewhat crude efforts of some of our British manufacturers, so long will they (the manufacturers) be content to run in the same old groove.

CHAS. W. HARRISON, A.M.Inst.C.E., A.M.I.Mech.E.

DIFFICULTY IN STARTING.

Sir,—With regard to the letter from "S.O.S." regarding starting trouble with a Connaught, it appears to me that the main cause is that the ignition is too far advanced, and possibly the sparking plug has too wide a gap; also, it is likely that the mixture of the gas is too rich, so that a smaller jet in the carburetter would make starting easier.

I have owned two single-geared standard model Connaughts—a 1913 and a 1915—and when properly tuned up they are, in my opinion, the most efficient and flexible two-strokes on the road. I could always obtain from 110 to 125 miles per gallon of No. 2 petrol, and, given skilful manipulation of the ignition retard lever, very few hills were unclimbable.

I fitted an extra air inlet in the induction pipe and gained fully 5 m.p.h., and think that a variable jet carburetter would also be a great improvement. I note that the miniature Connaught has fixed ignition, which to me seems a mistake and to spoil an otherwise excellent baby two-stroke.

E.E.F. NORMAN AISH (Lt. R.N.V.R.)

FOUR-CYLINDER MOTOR CYCLES.

Sir,—As your article of August 1st is not to be regarded as a condemnation of the single-cylinder motor cycle, so also the following effusion must not be considered a censure of the four-cylinder engine.

My idea is that makers should exercise the greatest caution before adopting a four-cylinder engine of 1,000 c.c. capacity—a size which is often used to propel a small car. Even for a motor cycle and sidecar such a capacity is seldom necessary. The ideal of design in a motor cycle or car is simplicity. Now a four-cylinder engine is a complication of parts, and must necessarily increase the cost of production.

For solo use the capacity of any motor cycle engine need not exceed 500 c.c. Allowing 10% for loss of efficiency due to increased internal friction, a figure which is in excess of what is required, we reach 555 c.c. The cylinders of a four of this capacity would be, therefore, in the neighbourhood of 54×60 mm.

My experience of such small dimensions is that the small bearings of the gudgeon pin, big end, etc., wear abnormally fast unless the oiling arrangements are equal to those of a car engine. To make the lubrication efficient, a pump, troughs, and sump are necessary at least; thus a 555 c.c. four-cylinder motor cycle engine would cost almost as much as a car engine of four times the capacity, the saving of material being the only real economy, as the workmanship would be practically the same for the one as the other.

A four-cylinder engine, apart from gear transmission and change speed, must increase the cost of a motor cycle, and after the war economy will be the keynote. How, then, is a four-cylinder motor cycle to be produced in quantities? Those who are experimenting with four-cylinder engines cannot hope to produce them cheaply unless they are made on the repetition system; and to enable that plan to be employed, large numbers must be sold, whereas the demand must be very limited in comparison with lower priced and more conventional types.

The direct pull of chain drive for the rear wheel hub is, in my opinion, better than a bevel gear at this point, chiefly because the rear fork of a motor cycle is not an ideal construction for resisting the thrust of a bevel gear.

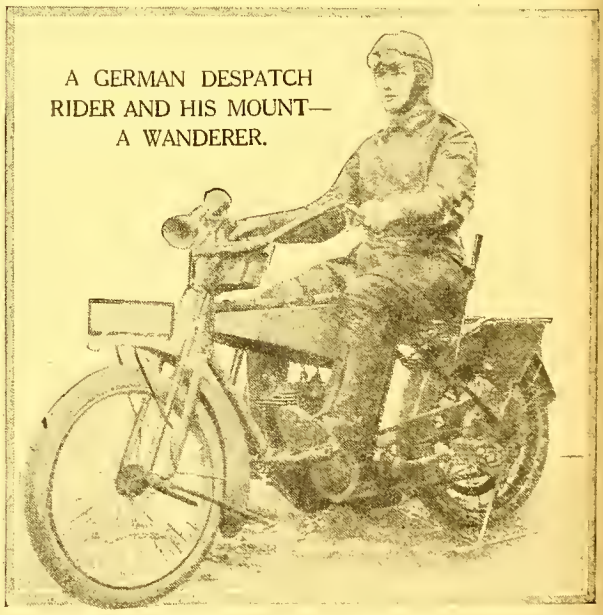
If four cylinders do become universal, I venture to prophesy that they will be of the vertical type; and I base this forecast on the fact that it is best for lubrication and low cost of production—a fact which is borne out by its survival on cars after every other known combination has been tried. The eight and twelve-cylinder V type car engines I regard in the light of a luxury, with extremely small advantages over a good four-cylinder vertical engine.

MECHANICUS.

Sir,—Knowing the interest taken in the four-cylinder machine at the present time, I feel that I ought to say a few words about a very interesting machine I have in my possession. For several years I have ridden Hendersons, and found them charming machines in every way. There was, however, one machine always in my mind, and I considered it to be superior in every way to the Henderson, except one—it had automatic inlet valves. Now, as everyone will know, I mean the four-cylinder F.N. I therefore thought that if I secured a new F.N. and converted it to the mechanical inlet principle I should have an ideal four-cylinder. And I have. I regret that at the present moment I am unable to provide photographs for publication, but if any reader is interested in the conversion, I shall be pleased to answer any letters which may reach me through you.

Briefly speaking, I have used the existing exhaust valves as the inlets, and have fitted a new manifold and domes to the heads of the cylinder, incorporating an overhead camshaft. This operates the exhaust valves, which thus take the place of the original inlet ones. My previous experience in aeroplane engine design has enabled me to design a very neat and efficient overhead valve gear, which is driven by a vertical shaft from the original exhaust valve camshaft. I may say I found a Claudel-Hobson carburetter improved the running immeasurably, and there are many other features which would no doubt be of great interest to your readers. However, I have already encroached too much upon your valuable space, but when hostilities cease I trust I may be permitted to publish these photographs in your paper. The date of manufacture of the machine is December, 1913.

B.E.F. A.L.M.D.



A GERMAN DESPATCH RIDER AND HIS MOUNT—A WANDERER.

The engine is a 3 h.p. twin with an under-geared pulley of large diameter. The tank is not a particularly graceful affair; in fact, the whole machine strikes one as being very far behind British design. The German D.R.'s are usually clad in leather suits, having a badge on their collar depicting a motor cycle. Details of this machine appeared on page 172 of our last issue.

STEAM MOTOR CYCLES.

Sir,—I think, from reading "Steam's" letter in a recent issue, that he is entirely unaware of what constitutes the modern steam-driven velocipede. A 2in. ×3in. engine, backed by a head of 500 or 600 lb., would produce a performance equivalent to that of a 20 h.p. petrol engine.

"Steam" will find 1⅛in. or 1⅛in. ×1⅛in. ample for his greatest needs in the motor cycle line, but the engine, etc., will need to be made for the job; model engine parts as on the British or foreign markets are of no earthly use. If "Steam" obtains No. 885 (April 11th, 1918) and No. 886 (April 18th, 1918) of the *Model Engineer and Electrician* (London) he will get information (the best hitherto published) with scale drawings of a "steam-driven motor cycle." It will get rid of 80% of his difficulties. The remaining 20% at his finger ends will put him in possession of a velocipede approaching in superlative excellence some of the machines existing in workshops in Scotland. The immediately following issues of the same weekly will show him in the sale columns the addresses of makers of castings with which to construct the engine. R. R. BERTRAM.

PETROL FOR SOLDIERS ON LEAVE.

Sir,—I see in your issue of August 15th letters from three soldiers regarding the petrol permits granted to men on leave from abroad, and I must say that candidly some of the men have, I am afraid, only themselves to blame for not getting petrol. Soldiers should proceed as did a certain man whom I will call Tom Jones. He was moved to France after serving elsewhere for two and a half years without leave home, and as he saw there was a good chance of now getting leave he wrote immediately for an application form, filled it up *correctly*, sent home for the registration form of the machine he was going to use, which, I may remark, has to be the applicant's or a near relation's, and kept these by him till a sign of leave came along; he did not know the exact dates of his leave, but he filled it in approximately, and sent in the form four weeks before time. Meantime, he got his driving licence, and the Inland Revenue tax was paid, as the machine, like a great many others, had been laid up for some considerable time. The result is that Tom Jones comes home and finds the permit actually waiting for him; the necessary taxes, etc., are all paid; no need to go chasing over the place about them when he gets home, and the said Tom Jones has a jolly good time. My advice to our lads out there is, do as Tom Jones did: Fill up the form and send it in in plenty of time. Help the Controller of Petrol as much as you can by answering just what is asked, and do not tell stories about your machine being laid up and getting the loan of a friend's (which may be all very true), but these things only make these officials suspicious, and consequently cause delay until they are satisfied. The taxes and other expenses certainly ought to be cancelled for soldiers on leave, *but they are not*, and if you want to use the "'bus," do what is required by law; there is absolutely no use in trying to kick against it when you have only a matter of ten days to do it in. The Controller is there not to give out petrol, but to keep folks from getting it. V.P.
Glasgow.

Sir,—The editorial footnote to my letter on this subject requires, I think, further comment on my part. It suggests alternative courses open to soldier applicants, and thereby implies that the onus of delay rests with them rather than with the Petrol Control Department.

Were the suggestions reasonably practicable in every case all would be well. On the contrary, neither would appear, under existing circumstances, to be of very much avail. So far as I am aware, a soldier does not receive at least three weeks' notice of leave—three hours would be nearer the mark—in fact, in the majority of cases he is never quite sure until actually entrained for home.

The other alternative is quite a feasible one in cases in which the soldier's home is within easy reach of 19, Berkeley Street, but in the case of a man bound for, say, the North of Scotland, fatigued with his long journey, encumbered with numberless articles of kit, and perhaps as the result of a bad crossing (this happened in the specific case I quoted) drenched with sea water to his birthday dress, it is surely unreasonable to expect him to fritter away one day of his all too short leave in the precincts of the Petrol Control Office.
FOUR CYLINDERS.

AUTOMATIC CARBURETTERS.

Sir,—Although single-lever carburetters have been the theme of numerous letters and articles recently, I feel that there are several points which have not received the amount of consideration due to them, and the recent article by "Rama" leaves one with the impression that they are most unsatisfactory unless run at a constant engine speed.

The duty of a carburetter is to supply the engine at all speeds with adequate fuel, and to maintain correct proportions so as to ensure maximum *efficiency*. This requires that the carburetter must be capable of delivering a comparatively small amount of fuel at low speeds, and a vastly increased amount for high speeds, which calls for what may be termed an "expandable" carburetter; and, given a carburetter of correct design, and, what is of equal importance, "correctly fitted," then perfectly satisfactory results can easily be obtained.

There are certain engines which will undoubtedly prove more satisfactory up to a certain point with a two-lever carburetter than with a single-lever—for instance, a low powered machine with a sidecar attached and single gear—but where the engine power and gear ratio are arranged in correct relation to the load, then an automatic will be found to give perfect satisfaction.

In support of the above statement, I may remind "Rama" that the best performance by any trade entrant in the Colmore Cup trials of 1914 (which had a record entry of 244 starters, comprising some of the greatest artists with the best two-lever carburetters) was won with a machine fitted with a single-lever carburetter. Further, in the English trials of 1913 a similar machine defeated 99% of the competitors in the speed trials, irrespective of class, and, further, maintained an extremely satisfactory m.p.g.

"Rama," comparing the ton-mileage obtained with motor cycles and lorries, states that many lorries average as *much* as 50 ton-miles. I go considerably further, and say that I have personally had lorries that will average 75-80 ton-miles. Whilst comparisons to a certain extent are useful, it is doubtful if the motor cycle will even approach the heavy vehicle as regards ton-mileage; but it does serve the purpose of illustrating that correct gear ratio in relation to weight and speed doubtless well repays those who give it proper consideration, and tends to emphasise the fact that "speed" is always an expensive luxury, whether it be on a horse or a motor cycle.
ERNEST P. EVEREST.

THE LONG STROKE ENGINE.

Sir,—Since I always appreciate Capt. Lindsay's notes, I rejoice that he did not take my criticism of his article on this subject too seriously. I would like to ask him, however, exactly what he means by the "short stroke low geared sewing machine type of engine," which "should be reserved for one's dotage"? Are auto-wheels short stroke? I confess I do not know; but, if so, I am wholeheartedly with him. I have a sneaking notion, however, that he was trying a smack at a type of engine which I rather favour—to boot, the flat twin.

If so, he stumbles into a common error. So far the flat twin which has engaged the widest and best deserved popularity is of the high revving order, with the result that flat twins in general have been dubbed sewing machines, buzy-boxes, etc. The 2¾ h.p. Douglas is naturally high-revving, on account of its small dimensions, *i.e.*, it is low-geared, yet, in spite of this low gear, it has put up speed stunts which have astounded everyone. This speaks well for the type.

My last 3½ h.p. flat twin machine turned a top gear of 4 to 1 absolutely unflinchingly, and its reliability was much enhanced by the fact that at any engine speed there was not the faintest suggestion of vibration. I think that when a few more of our practical riders have really tried the *large* flat twin we shall hear less regarding the virtues of the single.

But I am attaching an interpretation which perhaps I have no right to attach to Capt. Lindsay's letter, and let me say that for any type of engine which can be balanced at all speeds I am all in favour of the long stroke. For touring singles, however, I rather favour the square engine, though for the T.T., where nothing matters but speed and endurance, the long stroke scores again. With the exception of the T.T. Norton, the long stroke single-cylinder engines I have encountered were best adapted to the propulsion of vacuum cleaners and scissor-sharpening machines. CHINOOK.

RACING IN NEW ZEALAND.

British Motor Cycles hold their Own against High-powered Machines.

DETAILS are now to hand of a two days' motor-cycle race meeting held on the racecourse grass track at Napier, New Zealand.

The whole of the events, with but one exception, were run on handicaps open to all sizes of engine. The exception was limited to engines below 600 c.c., the ordinary classifications being "novices," "general," and "sidecar" events. The Americans, as usual, were well represented, but did not get it all their own way, though they made a very good showing, obtaining seven firsts, five seconds, and five thirds, to the Britishers' six firsts, five seconds, and five thirds. The big Indians and Harleys were kept on the move by a real hot-stuff Douglas ridden by H. Springfield, whose fastest average came out at 44 m.p.h. This rider entered for the six principal races, and carried off two firsts and two thirds. Coleman, the champion heavyweight, with a 7 h.p. Indian, secured two firsts and three seconds.

The Lightweight sets the Pace.

The sidecar events fell flat—the first day's race had only one entry and on the second day only two ran—a Harley and a Big X., the winner's time over the 5½ miles averaging 39.5 m.p.h.

On the first day the principal races were the 5½ Miles Lightweight Championship and the 13.2 Miles Open Handicap.

Springfield scored the ace in the lightweight race at 42.9 m.p.h. against another Douglas and a 2¾ h.p. Humber. L. Maughan (7 h.p. Harley) romped home in the mixed contest at an average speed of 45.2 m.p.h. On the same day a 9.9 Miles Handicap attracted twelve starters, and the winner, H. R. Crawley (7 h.p. Harley), reeled off 50.2 m.p.h. The track on this day was not very good and the going consequently heavy. By the next race day, however, the heat had improved matters, and the 16½ Miles Open Handicap proved the most exciting event of the meet. There were nine competitors for this race, comprising Springfield's Douglas, a 2¾ h.p. Triumph, and several notable 3½ h.p. machines, but, in spite of the handicapping, the results rested with the heavies, and Coleman's Harley streaked home at 63 m.p.h. A 3½ h.p. Triumph beat the field at 48.2 m.p.h. in the 600 c.c. limit handicap against a crowd of 2¾ h.p. machines. A 2¾ h.p. Triumph came in second after an exciting tussle with Dawber's Indian. On the whole the British motor cycles did remarkably well, considering the high-powered machines they were up against.

Views on the course. Lightweight machines at the start.

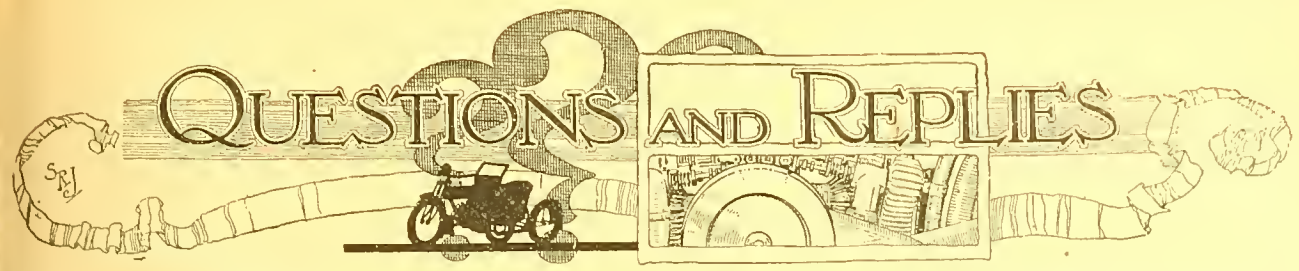
FRENCH ROADS AFTER THE WAR.

IT was quite clear to those who motored in France before the war that the present French road system no longer complied fully with the traffic requirements since the introduction of the motor vehicle. *Technique Moderne*, in a recent issue, has become alive to this fact, and considers that, as it is evident that self-propelled vehicles are bound to increase largely in numbers after the war, it becomes necessary to modify the mode of formation of certain of the main arteries of locomotion in order to adapt them for this means of transport.

The French roads have always been ahead of ours from the point of view of utility, if not from the picturesque side. Where they beat our roads is in their straightness and in their magnificent grading. Such a vehicle as a single-geared cycle car was an impossibility from the very beginning in England, but in France it was capable of covering quite long distances on the straight, flat, well-graded roads.

It was as regards surface that the English roads were superior to those of other nations, and it is as regards surface that the French roads failed lamentably. There were very few steam rollers, and the material was soft and crumbled easily into dust.

France has something like 372,800 miles of roadways, and it seems that steps are being discussed to meet the demands of increased fast motor traffic by the formation of reinforced concrete roads, and there is talk of a Consultation Committee to devise the best plan of roadmaking, looking to the nature of the future traffic and to determine in what way it may be possible to secure the requisite funds for the purpose.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Petrol for Teaching Driving.

I have a permit to use my motor cycle and sidecar for buying and selling connected with my business. I wish to employ a girl to drive for me, and as she cannot drive at present I am asking your advice as to whether I am in order in teaching her. I hold a full duty permit.—C.C.

In the opinion of the Petrol Controller's Department, 19, Berkeley Street, London, W.1, petrol may be used for the purpose of teaching the girl driver whom you intend to employ.

Electrical and Others.

I have a 3 h.p. Minerva which I require to drive a 10 v. 3-4 amp. dynamo. (1.) I have been advised to have a non-trembler coil. Is this right? (2.) Can I charge a 4 volt 10 amp.-hour accumulator from the dynamo? If so, would you tell me what lamps to use as resistances, and what connections? (3.) Also what voltage and c.p. lamps should I use with (1) dynamo and (2) accumulator? (4.) The inlet valve of the engine is of the automatic inlet valve type, and it is very stiff. How can I ease it? (5.) What position should the air and petrol levers of the carburetter be in when starting? (6.) How can I successfully bend brass and copper tubing?—W.T.

(1.) Yes. (2.) Yes, if the dynamo is shunt wound, *i.e.*, if it gives a direct current. This must be ascertained before attempting to charge the accumulator. The negative terminal of the accumulator should be wired to the negative terminal of the dynamo. The plus terminal of the accumulator should be led to the plus terminal of the dynamo, but this wire should be interrupted by the introduction of a lamp with ampèrage equivalent to the charging rate of the accumulator (which should be printed on it), and voltage not less than that of the dynamo. (3.) The dynamo should light a 10 volt 30-40 c.p. lamp, the accumulator a 4 volt 4 c.p. lamp for about eight hours. (4.) The trouble is most likely due to a too stiff inlet spring or to stiffness of the valve in its guide. The valve stem should be cleaned by filing or by rubbing with emery cloth. (5.) Air closed, throttle one-third open. (6.) This is a very difficult matter to achieve successfully, and as you are obviously inexperienced you would be better advised to take the work you want done to a capable local repairer.

Bluing Soldered Metal.

Will you please tell me a compound for bluing steel? As some parts are soldered I cannot use heat in the process.—E.S.D.

As you cannot use heat, we are afraid you cannot achieve your object. The main point of the whole matter rests in the employment of heat. A blue effect may be obtained by the application of lacquer containing any suitable pigment; but, of course, this kind of blue is bound to be very different from that which you require. The main difficulty lies, of course, in the solder. If this is ordinary tinman's solder it will melt at about 230° C. to 240° C., whereas bluing would necessitate a temperature of 350° C. to 400° C. It is possible, however, to obtain solder which will stand much higher temperatures, and if you care to replace your existing solder with some of this variety you may carry on your bluing without risk.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

The Use of Petrol.

I have offered my motor cycle to a person who lives ten miles from me. He has seen the motor cycle in the shed where it is stored, and appears satisfied with its appearance and condition, but would like to see it run on the road, and I have promised to take it over if possible. Would you please enlighten me about the law on this matter? I have sufficient petrol for the journey. I have not taken out the £1 tax and do not intend to. I would renew my driving licence.—V.G.

There will be no difficulty about your delivering the machine. You may use the machine for the purpose mentioned in your letter by applying to your local Chief of Police, who will give you a permit for the purpose. We fear that using the machine renders you liable for the £1 local taxation licence.

Hiring a Machine.

I am hoping to spend my forthcoming leave in North Wales, and I am writing to ask if you could possibly give me the names of any firms in or near Llandudno who have cars, cycle cars, or motor cycles, and sidecars for hire. I have an Indian and sidecar of my own in Surrey, but it is not worth while taking it up to North Wales for a week either by road (as that would run away with one's whole allowance of petrol) or by train, which, if permissible, would be extremely expensive. I shall be staying in the mountains, the nearest town to which would be Llandudno. I should be very grateful if you could put me on the right tack. Your interesting paper does much to relieve the monotony out here.—H.M.S.T.

Conditions are so abnormal at the present time that we are afraid we cannot give you any guidance in answer to your question. In ordinary times you would have great difficulty in hiring a machine in the neighbourhood of Llandudno; but, possibly, the very abnormality of present conditions may enable you to do this. At the best of times the hiring of a motor cycle and sidecar is a difficult matter, and we are sorry we cannot give you any more definite information.

RECOMMENDED ROUTES.

COVENTRY TO WESTON-SUPER-MARE.—P.H.C.

Coventry, Stratford-on-Avon, Cheltenham, Stroud, Thornbury, Filton, Clifton Downs, Long Ashton, Flax Bourton, Congresbury, Weston-super-Mare.

SLOUGH TO MELTON MOWBRAY.—W.W.D.

Slough, Beaconsfield, Amersham, Chesham, Tring, Ivinghoe, Leighton Buzzard, Woburn, Newport Pagnell, Olney, Wellingborough, Kettering, Uppingham, Oakham, Melton Mowbray.

SOUTHAMPTON TO LIVERPOOL AND MANCHESTER.—W.J.P.

Southampton, Winchester, Whitchurch, Newbury, East Ilsley, Abingdon, Oxford, Banbury, Southam, Coventry, Fillongley, Over Whitacre, Tamworth, Lichfield, Rugeley, Weston, Stone, Pipe Gate, Woore, Nantwich, Tarporley, Chester, Birkenhead, by ferry to Liverpool.

For Manchester, turn right at Nantwich, and go through Middlewich, Knutsford, and Altrincham.

Liverpool to Manchester: Liverpool, Prescot, Rainhill, Warrington, Eccles, Manchester.

Attractive Advertising.

Readers cannot have failed to notice the series of striking advertisements relating to Precision engines which have appeared in this paper during the last six months under the title of "Famous Motor Cyclists."

This series is now exhausted, and Messrs. Baker commence in this issue an equally effective series called "Men of Precision."

History of the Cycle.

The B.S.A. Co. have issued a very attractive booklet on the history of their firm since its inception in 1854 as manufacturers of rifles for the Government.

Some of the illustrations and extracts have appeared as advertisements in recent issues of *The Motor Cycle*. Their history since 1880 is the history of the cycle, and its evolution from the Otto bicycle of that year to the present-day power machine forms interesting and informative reading.

The B.S.A. Co., Ltd., will be pleased to send a copy of this booklet to those interested on receipt of a postcard.

Decorative Aids to Business.

The makers of the Pedley tyres, belts, and other rubber accessories have ready for despatch to agents and garages who are willing to exhibit them some very tastefully designed showcards, wall posters, and window transparencies. The design is that of a youthful gentleman clothed as to his upper garments in a Pedley tyre cover, and as to his nether apparel in Pedley belts.

Applications for these decorative aids to business should be made to Messrs. J. Pedley and Son, Great Charles Street, Birmingham.

Change of Address.

Mr. A. Atkinson, motor engineer and sidecar specialist, the patentee of the Ort windscreen, informs us that he has transferred his business to larger premises at 307, Uxbridge Road, London, W.12. As formerly, he is still able to supply hoods, windscreens, and aprons for sidecars.

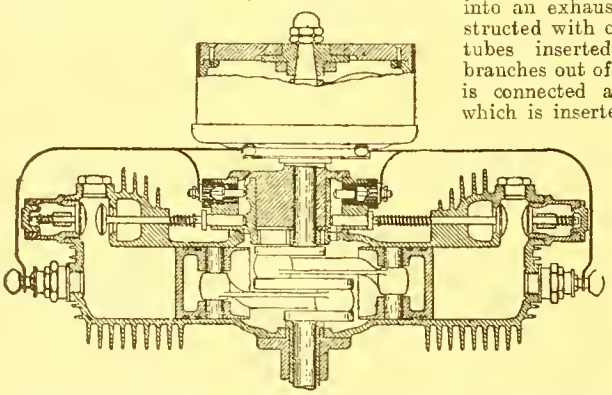
Review.

"Honourable Mention." A military souvenir bearing this title was published by the Harley-Davidson Motor Co., Ltd., Harleyson House, Newman Street, London, W.1, in 1916. Their latest edition, which is now ready, is printed on art paper, and is remarkably well got up. It contains photographs of a large number of Harley-Davidson riders who are serving with the Forces. Readers of *The Motor Cycle* who are interested should write to the Harley-Davidson Co. for a copy. Among the many riders of this well-known machine we may mention the late Capt. Vernon Busby, R.A.F., whose picture appears on page 12 of the souvenir.

PATENTS by Eric W. Walford

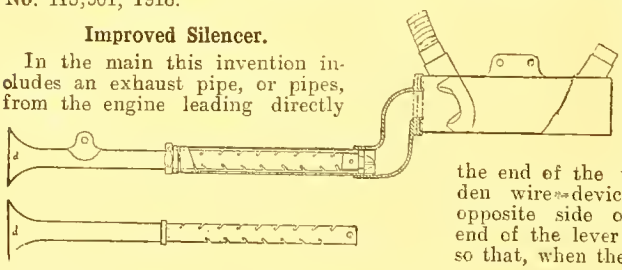
Ignition Apparatus.

This invention relates to a flywheel magneto running at crankshaft speed and the methods employed to cut out the idle spark accruing therefrom. It is proposed that the distributer should comprise a single contact segment and a recessed contact plate connected to "earth," all to be fixed to an insulated disc adapted to rotate with the engine crankshaft, the current being led through a friction contact to the disc, whence it passes to one or other contact, to a corresponding sparking plug or is earthed. The branches are taken from each of the sparking plug circuits to contacts which engage with means controllable by, or which operate, the exhaust valve gear, whereby the respective plug is short-circuited when the said valve is open.—C. A. Hult, Sweden, No. 115,901, 1918.



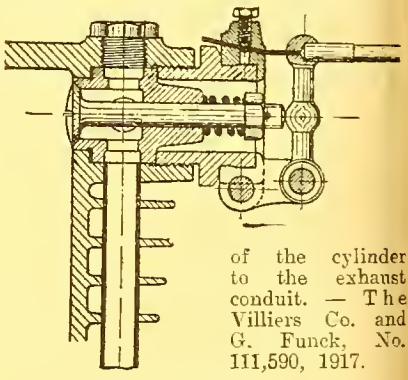
Improved Silencer.

In the main this invention includes an exhaust pipe, or pipes, from the engine leading directly into an exhaust box which may be constructed with one or more small boxes or tubes inserted therein, one of which branches out of the exhaust box, to which is connected a tube or "tail pipe" in which is inserted a smaller tube or tubes which are plugged at one end, whilst the other is shaped to any desired form with an outlet, the said plug having deflectors which allow the exhaust gases to pass through in waves into the tail pipe. The small tube which is inserted into the larger tube or tail pipe has slits, slots, or perforations through which the exhaust gases escape from the expansion chambers or tubes.—G. E. Rigby, No. 110,833, 1917.



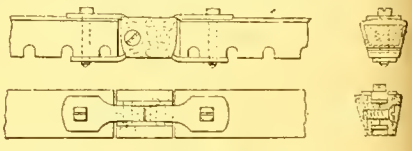
Compression Release Valve.

Some minor improvements in a compression release valve are the subject of this patent. A tubular extension surrounds the valve stem, and a collar which can be screwed around the extension carries all the elements for operatively connecting a Bowden wire with the valve. The collar has hinged to it on one side a lever, which extends across the collar and thus across the end of the valve stem. The Bowden wire device is connected to the opposite side of the collar and that end of the lever which lies at that side, so that, when the wire device is operated, the lever is thrust inwards and opens the valve against the action of its spring. The valve chamber is shown as having a tubular connection running down the side of the cylinder to the exhaust conduit. — The Villiers Co. and G. Funck, No. 111,590, 1917.



Belt Fasteners.

This invention relates to belt fasteners for motor cycles designed to provide a good bearing surface on the pulleys at the joint between the connected ends of the belt. The device comprises two centrally disposed U shaped links capable of being fixed to the ends of the belt in any suitable manner, and two connecting side links arranged so as to fill the gap between the ends of the belt. The side links are constructed of vulcanised fibre or rubber coated metal.—D. H. Godwin, Woking, No. 110,408.



Amateurs who take an interest in patent matters will find that the perusal of our handbook "Motor Cycles and How to Manage Them" will materially assist them in understanding the patent specifications and drawings in this feature of the paper.

Any little Jag like that

you need not worry over if you have at hand that wonderful new material

Mend-a-Tear PATENT

It will mend it in a minute, and when the operation's over you will not be able to distinguish the spot where the overall was torn.

And you, "mere man"—as woman calls you—can do the job alone without recourse to the lady of the household.

No waiting—no fuss—no needles—no stitches—but just a little bit of "**Mend-a-Tear**" to place behind it, a heated flat iron, a single pressure, and the job is done, and the repair more permanent than by any other method.

Ask Cycle Agent, Garage, Draper, or Chemist, for "Mend-a-Tear." It is sold in 1/- Cartons—Khaki for Mackintosh and general wear—General for all other clothes.

Free sample direct in return for 1½d. stamped addressed envelope.

LEICESTER RUBBER CO., LTD.,
10, Granby Mills, Leicester.

Also Makers of the Famous John Bull Cycle and Motor Cycle Tyres.

1661

REMEMBER

That all the undermentioned machines are guaranteed, and that we will exchange free of charge within three weeks of purchase any machine that does not give entire satisfaction. This system of trading applies also to our 30 Light Cars and Sporting Cars in stock. Full lists free. Exchanges.

SELECTION FROM STOCK.

ARIEL, 1916, 6 h.p., 3-speed coachbuilt Combination ..... 75 gns.
BRADBURY, 1913, 4 h.p., 2-speed, clutch, renovated ..... 29 gns.
BRADBURY, 1914, 4 h.p., 3-speed coachbuilt Combination ..... 35 gns.
B.S.A., 1913, 3½ h.p., 2-speed, clutch, pedal-start, renovated ..... 29 gns.
CALTHORPE-J.A.P., 1917, 2¾ h.p., 2-speed, clutch ..... 31 gns.
CALTHORPE-J.A.P., 1916, 2¾ h.p., 2-speed, clutch ..... 29 gns.
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-speed, clutch ..... 25 gns.
CALTHORPE, 2-stroke, 1916, 2-speed ..... 23 gns.
CALTHORPE, 2-stroke, 1916, single-speed ..... 17 gns.
CONNAUGHT, 1915, single-speed, 2-stroke ..... 18 gns.
CLYNO, 2½ h.p., 2-speed, 2-stroke, clutch, renovated ..... 27 gns.
DOUGLAS, late model, 4 h.p., T.T. Colonial model, 3-speed, as new ..... 59 gns.
DOUGLAS, 1914, 2¾ h.p., 2-speed, clutch, kick-start ..... 34 gns.
DOUGLAS, 1915, 2¾ h.p., T.T., 2-speed ..... 39 gns.
ENFIELD, 1916, 3 h.p., 2-speed, clutch, kick-start, renovated ..... 39 gns.
F.N., 1914, 7-9 h.p., 4-cylinder, 3-speed gear box, clutch, kick-start, Mills-Fulford underslung coachbuilt Sidecar ..... 69 gns.
HUMBER, brand new 1918 flat twin, 3-speed, in stock ..... 75 gns.
HUMBER, 1913, 3½ h.p. 2-speed coachbuilt Combination ..... 35 gns.
HARLEY-DAVIDSON, 1915, 7-9 h.p. 3-speed dynamo lighting Combination 65 gns.
INDIAN, 1915, 5 h.p., 3-speed, T.T., clutch, kick-start ..... 45 gns.
INDIAN, 1915, T.T., 7-9 h.p., clutch ..... 39 gns.
INDIAN, 1914, T.T., 7-9 h.p., clutch ..... 29 gns
INDIAN, 1914, 7-9 h.p., 2-speed ..... 34 gns.
INDIAN, 1913, 7-9 h.p., 2-speed ..... 29 gns.
INDIAN, 1914, 7-9 h.p., 2-speed coachbuilt Combination ..... 52 gns.
JAMES, 1916, 3½ h.p., twin, 3-speed, clutch, kick-start ..... 48 gns.
JAMES, 1915, 3½ h.p., twin, 3-speed, clutch, kick-start ..... 42 gns.
JAMES, 1914, 4¼ h.p., single, 3-speed, renovated ..... 35 gns.
JAMES, 1914, 4¼ h.p., single, single-speed, renovated ..... 29 gns.
LINCOLN-ELK, 1913, 3½ h.p., variable gear, waterproof Bosch ..... 19 gns.
MATCHLESS, 1914, 8 h.p., T.T., 6-speed, renovated ..... 39 gns.
MATCHLESS, 1913, 6 h.p., 2-speed, coachbuilt Combination ..... 35 gns.
MOTOSACOCHE, 1916, 3½ h.p., twin, 2-speed, clutch, kick-start ..... 42 gns.
NEW HUDSON, 1915, 6 h.p., 3-speed, coach Sidecar, renovated ..... 52 gns.
NEW HUDSON, 1916, single-speed, 2-stroke ..... 22 gns.
NEW IMPERIAL, 1916, 2-speed J.A.P. 2¾ h.p., renovated ..... 29 gns.
NEW IMPERIAL, 1915, 2-speed J.A.P., 2¾ h.p., renovated ..... 25 gns.
NEW HUDSON, 1913, 3½ h.p., 3-speed Combination ..... 39 gns.
N.S.U., 1913, 3 h.p. twin, 2-speed, clutch, pedal-start ..... 19 gns.
O.K.-J.A.P., 1916, 2-speed, hand-clutch, 2¾ h.p., renovated ..... 28 gns.
PREMIER, 1913, 3½ h.p., 3-speed ..... 27 gns.
PREMIER, 1914, 3½ h.p., 3-speed ..... 29 gns
PREMIER, 1914, 3½ h.p., 2-speed countershaft ..... 29 gns.
PREMIER, 1915, 2½ h.p., clutch, perfect ..... 24 gns.
RUDGE-MULTI, brand new 1917, 3½ h.p., standard ..... £65 10.
RUDGE-MULTI, genuine T.T., 3½ h.p., I.O.M. model, disc wheels long plated exhaust pipe, as new ..... 68 gns
RUDGE-MULTI, 1914, 3½ h.p., standard, renovated ..... 34 gns
RUDGE-MULTI, 1913, 3½ h.p., standard ..... 27 gns
RUDGE, 1915, 5-6 h.p., 3-speed, renovated ..... 39 gns.
RUDGE, 1914, T.T. Philipson, 3½ h.p., renovated ..... 27 gns.
REX, 1913, 6 h.p. Combination, 2-speed ..... 27 gns.
SCOTT, 1914, 3⅜ h.p., 2-speed Combination, 39 gns.; solo ..... 33 gns.
SCOTT, 1913, 3⅜ h.p., 2-speed Combination, 34 gns.; solo ..... 27 gns
SCOTT, 1912, 3⅜ h.p., 2-speed Combination, 29 gns.; solo ..... 22 gns
SUNBEAM, 1915, 6 h.p., 3-speed Combination, Gloria Sidecar ..... 87 gns.
SUN-VILLIERS, 1916, 2-speed, 2-stroke ..... 22 gns.
SUN-VILLIERS, 1915, single-speed, 2-stroke ..... 17 gns.
SINGER, 1914, T.T., 2½ h.p., clutch ..... 19 gns.
TRIUMPH, 1914, T.T., clutch, red finish ..... 29 gns.
TRIUMPH, 1913, 3½ h.p., 3-speed Combination ..... 35 gns.
T.D.C. de Luxe, 2-speed 2-stroke ..... 22 gns.
VELOCE, 1916, 2-speed, 4-stroke ..... 26 gns.
VELOCETTE, 1915, 2-speed, 2-stroke, ladies' model ..... 27 gns.
WHITING-J.A.P., 1916, 4-5 h.p., twin, 4-speed, Jardine, spring frame ..... 56 gns.
WILLIAMSON, 1915, 8-10 h.p. water-cooled Combination ..... 65 gns.
WOOLER, 1916, 2-speed, 2-stroke, spring frame ..... 27 gns.
ZENITH-GRADUA, 1915, 8 h.p. countershaft, Corvette Sidecar ..... 59 gns
ZENITH-GRADUA, 1915, 8 h.p., T.T., solo ..... 49 gns
ZENITH-GRADUA, 1914, 6 h.p., clutch, kick-start ..... 45 gns.
ZENITH-GRADUA, 1914, 3½ h.p., renovated, as new ..... 32 gns.
ZENITH-GRADUA, 1913, 6 h.p. direct drive, solo ..... 37 gns.

Any machine sent on "The Motor Cycle" Deposit System.

RIDER TROWARD & CO., 31, 40b, & 78, High Street, HAMPSTEAD, N.W.3.

'Phone: Hamp. 4904, 5392 One minute from Hampstead Tube Station. 20 minutes from West End. Open till 7 p.m. and on Sundays.

In answering these advertisements it is desirable to mention "The Motor Cycle." A39

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regutar trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should he accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

2¾h.p. A.J.S., 3-speed, fully equipped, like new; £46/10.—15, Rustic Av., Streatham, S.W.16. [7642

A.J.S.—Four 1915 6h.p. A.J.S. combinations: £75-£81. See advert., page 15.—Maudes', Gt. Portland St., London [7741

LATE 1914 6h.p. A.J.S. Combination, beautiful sidecar, excellent condition; 56 gns.—436, Whitehorse Rd., Thornton Heath. [7711

A.J.S.—Immediate delivery of Military Model, 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

1916 A.J.S., 2¾h.p., 3-speed, T.T. bars, Lucas horn absolutely as new.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

A.J.S., 1916, T.T., 2¾h.p., 3-speed, hand controlled clutch, kick starter, all enclosed chain drive, fully equipped; sacrifice £45; absolutely perfect.—Halton, 16, Stour St., West Bromwich, Staffs. [7676

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4987

Alldays.

ALLON, 2¾h.p., 2-stroke, 2 speeds, hand clutch, lamps; bargain, 26 gns.; any trial.—39, Crewdson Rd., Clapham Rd., London, S.W. [7715

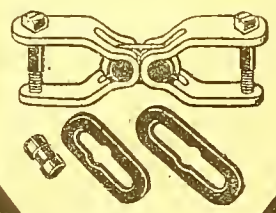
A sure Shield against Breakdowns

FORWARD fasteners never fail—their strength is exceptional, and quality the keynote of their manufacture.

Never take any risk with other kinds when pence only will secure for you the safest, soundest fastener in the World—the one that never fails—The

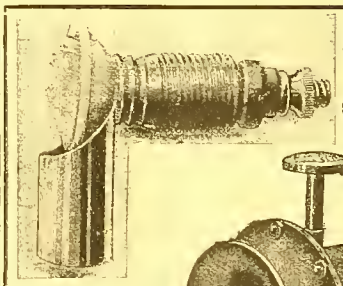
FORWARD

FORWARD MOTOR Co., Forward Works, Summer Row, BIRMINGHAM.

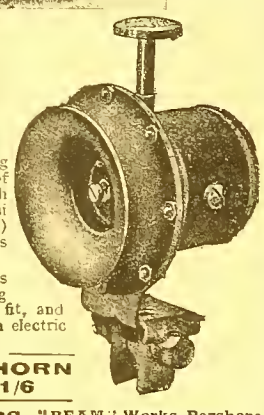


The Forward Price 1/6

1662



ELECTRIC ADAPTER, Price 4/9 each. Spare Bulbs 1/2 each.



This is a small fitting to enable owners of gas lamps fitted with burners of the Roni type (round stem) to make their lamps into electric.

The "adapter" fits over the existing burner with a tight fit, and is connected to an electric wire and battery.

BRITISH HORN Price 21/6

F.R.S. LAMPS, "BEAM" Works, Pershore Street, BIRMINGHAM.

ROSCO CYLINDER BLACK.

PRESERVES YOUR CYLINDERS.

Tins, 6d. Withstands Heat. Post Free, 8½d.
Tins, 1/- Post Free, 1/3½

Sole Manufacturers:

OWEN BROS., HULL, Eng.

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Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

4h.p. Bradbury, sidecar, 3-speed, perfect condition; any trial.—Wickens, Hollingbourne, Kent. [7655

4h.p. Bradbury Combination, free engine, 2 speeds, guaranteed perfect order, first-class condition; £20; send on approval, deposit.—Box 2,229, c/o *The Motor Cycle.* [X7405

Brough.

1916 3½h.p. T.T. Brough, only done 2,000 miles, very fast, perfect condition, speedometer, lamps, etc.; 49 gns.—Lieut. Loyd, 1, Ovington Gardens, London. [7470

1916 (late) Brough, Sturmey 3-speed countershaft, original tyres, very fast, lamps; any trial; £65; exchange Harley or Henderson, cash either way.—Deane, Matlock Bath, Derbyshire. [X7412

B.S.A.

4½h.p. 1915 B.S.A. Cancelet Combination, countershaft, all equal new; £50.—Palmer's Garage, Tooting. [7681

B.S.A., 1916, 4½h.p., 3 speeds, large underslung sidecar, lamps, very smart; £65, offer, exchange.—24, Beauval Rd., East Dulwich. [7698

B.S.A. 1913 Combination, C.B., 2-speed, clutch, speedometer, lamps; exchange big twin or 4-cyl.; £30.—7, Linda St., Battersea. [7714

B.S.A., 1913, free engine, clutch, pedal start, new tyres, very good condition; £20.—W. Pudder, Heather Band Lodge, Hindhead, Surrey. [7655

1915 B.S.A., Model K., excellent order, very smart appearance, lamps, mirror, Lucas horn, etc.; £40.—Pearce, Westonville, Great Missenden. [X6916

B.S.A., late 1913, 3½h.p., 2-speed, free engine, Gloria sidecar, Lucas lamps, horn, etc., splendid running order and condition; £35, or nearest offer.—Woodman, Chemist, Burnham-on-Sea. [7670

B.S.A., 1916, chain drive, 3-speed, kick start, underslung coachbuilt sidecar, speedometer, 3 lamps, accessories, excellent condition; £55.—Charlton Kennels, Shooters Hill Rd., Woolwich, S.E.18. [7656

B.S.A., 1915, 4½h.p., 3-speed, etc., sidecar, luggage grid, speedometer, and all accessories, condition as new, not used for past 2 years; owner joining up; £50, no offers.—C. W. Fish, Rawcliffe, Goole. [X7414

B.S.A., 1914, I.O.M. T.T., genuine, like new, not done 2,000 miles, 3-speed countershaft, chain and belt driven, foot oil pump, tyres, enamel, plating new, 2 lamps, generator, mechanical horn, knee pads, guaranteed in new condition throughout; offer.—E. Monti, 65, Princess Rd., Kilburn, London. [7513

B.S.A. Combination, 1914, 3½h.p., clutch model, kick starter, condition as new, just overhauled at cost of £10, new tyres, belt, etc., lamps, generator, horn, torpedo sidecar, brand new Phœnix; sacrifice £36; owner going France; evenings 7-9, or week-end by appointment.—Holvoet, 141, Goldhurst Terrace, Hampstead, N.W.6. [7665

Calthorpe.

CALTHORPE Lightweight, 2½h.p. J.A.P., 2-speed gear; £24.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3523

CALTHORPE Junior, 2-speed, guaranteed perfect, and good condition; £22.—136, Harrington Rd., S. Norwood, London, S.E. [7658

MOTOR CYCLES FOR SALE.

Calthorpe.

THORPE Motor Cycles.—All models in stock for immediate delivery; trade supplied; no permits to—P. J. Evans, 91, John Bright St., Birmingham. [0955

Chater-Lea.

TER-LEA Combination, 8h.p., coachbuilt sidecar, splendid condition; no dealers; also Douglas. High Rd., Chiswick. [7701

Coventry Eagle.

p. 1918 Coventry Eagle, 2-speed lightweight, as new, only run 40 miles; £32.—Palmer's Garage, s. [7682

Douglas.

'GLAS.—Prompt delivery to those on work of national importance.—Gibb, Gloucester. [4749

'GLAS, 1912, 2¾h.p., 2-speed, wants tuning; bargain, £16.—Wilson, 66, West Sq., S. Farnham, Hants. [7702

'GLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Tel.: 50. [5855

'GLAS T.T., 1914, fast, new tyres, long exhaust; snip, £30.—Lt. Hellett, R.A.F., 8, St. ns Rd., Brighton. [7709

'GLAS Motor Cycles.—We can supply by return 918 models on receipt of permit.—Eli Clark, uglas agent, 196, Cheltenham Rd., Bristol. [0923

GLAS, 2¾h.p., 1913, 2-speed, semi T.T. bars, new frame, in sound condition, with horn and meter; £25.—Box L6,891, c/o *The Motor Cycle*. [7465

GLAS Motor Cycle, with sidecar, 1914, 2¾h.p., excellent condition.—W. Barrington Garage), 301, End Rd., W. Kensington. 'Phone: Ken. 4680. [7647

Douglas Motor Bicycles.—The latest 2¾h.p. odels for instant delivery for those engaged on f National importance against permits. How and to obtain them, fullest particulars and prices, o Robinson's Garage, Green St., Cambridge. [7707

4h.p. Douglas Combination, chain drive, one-lever carburetter, interchangeable wheels, the n every respect, with special coach sidecar, hood, and spring wheel, 3 lamp sets, Cowey speed-horn, in perfect condition, driven a few miles or demonstration purposes.—Prices and particu-obinson's Garage, Green St., Cambridge. [7708

Enfield.

AL Enfield 1914 2¾h.p. Twin, 2 speeds, chain ive, splendid condition; £16.—175, Stockwell rixton. [7716

ELD 3h.p. Twin, 66 gns.; touring and T.T. odels in stock.—Exeter Motor Cycle Co., Ltd., d., Exeter. [3522

ELD, 2¼h.p., 1911, just overhauled; £13; change 1913 Douglas 2-speed.—Box L6,957, e *Motor Cycle*. [7725

(very late) Enfield Combination, 6h.p., lamps, horn, splendid condition; £80.—Elce and Co., Bishopsgate Av., Camomile St., E.C.3. [0552

Royal Enfield Combination, 6h.p., lamps, horn, Jones speedometer, screen, in good condition; exchange for small car, cash adjustment either llefs only.—J. R. Canty, Crocken Hill, Swanley. [7633

ELD 3h.p. and Watsonian lightweight sidecar, w condition; £34, or Douglas in exchange.—rn, 22, Model Cottages, East Sheen, S.W. Apnt only. [7691

ELD, 1914, 6h.p., 2-seater sidecar, £60; 1915 .p. combination, £70; ditto, £72; 1916 8h.p. ition, 2-seater sidecar, £82; 1914 3h.p., 2-speed, 25.—Maudes', 100, Gt. Portland St., London. [7738

1916 Enfield 6h.p. Combination, T.T., disc eels, sporting sidecar on Enfield chassis, mile-00, 3in. tyre on back wheel, Lucas head light, rear light; £80; seen Coventry.—Box 2,228, e *Motor Cycle*. [X7406

Harley-Davidson.

. 1915 Harley-Davidson Combination, full electrical equipment, as new; £70.—Palmer's Garage, [7680

Harley-Davidson and Sporting Torpedo Sidecar, lamps, horn, very nice condition; £110.—d Co., 15-16, Bishopsgate Av., Camomile St., [0551

LEY-DAVIDSON.—We have three Harley-avidson combinations on offer, 1916 and 1917. vert., page 15.—Maudes', Gt. Portland St., Lon-[7739

Harley-Davidson, thoroughly overhauled and repainted olive green, unused; genuine bargain, loban, c/o D. Billing, Gt. Chapel St., Oxford St., [7634

ns, complete.—Late 1915 Harley-Davidson combination, like new, been stored; a real bargain; d ridden any time.—Miller, 62, Hampstead Rd. [7699

ALL GUARANTEED

ALL RELIABLE

ALL READY

to ride away immediately. We can arrange repurchase if required for men on leave able to get a petrol permit.

RUNABOUTS AND CARS.

MORGAN,	1915, G.P., being repainted	£128
MORGAN,	1917, M.A.G., de luxe, helio. finish, discs	£139
MORGAN,	1916, G.P., dark red, disc wheels	£130
MORGAN,	1914, G.P., 80 mm. tyres, all lamps	£105
MORGAN,	1917, G.P., J.A.P., finished dark green	£135
MORGAN,	1917, G.P., water-cooled M.A.G., as new	—
MORGAN,	1916, G.P., M.A.G., discs, dark red	£140
MORGAN,	1916, G.P., J.A.P., discs, dark blue	£130
SWIFT,	1914, 7-9 h.p., standard model	£135

SIDECAR COMBINATIONS.

SUNBEAM	1914 6 h.p. Combination	£70
ZENITH,	1914, 4-5 h.p., Gradua countershaft gear	£45
INDIAN,	1915, 7-9 h.p., 3-speed, as new	£72
HARLEY-DAVIDSON	1917 2-seater Combination	£128
HARLEY-DAVIDSON	1917 8 h.p. Combination	£125
HARLEY-DAVIDSON	1916 Combination, electric	£76
ENFIELD	1915 6 h.p. Combination spring handlebars	£70
ENFIELD	1915-16 6 h.p. Combination, all accessories	£72
ENFIELD	1914-'8 h.p. Combination, 2-seater Sidecar	£60
ENFIELD	1916 8 h.p., 2-seater Sidecar	£82
A.J.S.,	1915, 6 h.p., spare wheel, speedometer	£81
A.J.S.,	1915, as above, but less screen	£79
A.J.S.,	1915, less speedometer and spare wheel	£75
A.J.S.,	1915, 6 h.p., all lamps, horn, and tools	£77
MATCHLESS,	1918, 8 h.p. M.A.G. model, hardly used	£164
MATCHLESS	1918 war model, £10 of accessories	£120
MATCHLESS,	1917, 8 h.p. M.A.G., Lucas dynamo, as new	—

SOLO MACHINES.

RUDGE,	3½ h.p., special Isle of Man Model	£40
ZENITH,	1917, 4-5 h.p., condition like new	£52
CONSUL VILLA,	1916, 2-speed, 2½ h.p., 2-stroke	£34
A.B.C.,	1914, special Isle of Man engine	£75
TRIUMPH,	1908 (Dec.), touring model	£17
TRIUMPH,	1913, 3½ h.p., clutch model, as new	£20
ENFIELD,	1912, 2¾ h.p., 2-speed, chain drive	£21
ENFIELD,	1914, 3 h.p., 2-speed twin, M.A.G. engine	£25
RUDGE,	1912, 3½ h.p., fixed gear, picked engine	£20
LEVIS,	1917, shop-soiled, 2-speed, 2-stroke	£46

LISTS GIVING FULLER PARTICULARS UPON REQUEST.

MAUDES' MOTOR MART,

100, Great Portland Street, LONDON - - - - - W.1.

Telephone - - - - - - - - 552 Mayfair.
Telegrams - - - Abdicate, Wesdo, London.

MOTOR CYCLES FOR SALE.

Humber.

1916 Humber Combination, 4½h.p., water-cooled, 3-speed, clutch, kick starter, Millford sidecar, all in new condition, very little used; £50, or near offer.—Robertson, 39, Pulborough Rd., Southfields, Wandsworth. [7672

Indian.

INDIAN 1916 Powerplus Sporting Combination, 3-speed, clutch, etc., fine order; £70.—54, Stiede Rd., Willesden, N.W. [7693

INDIAN Combination, 7-9h.p., 2 speeds, kick start, 90 m.p.g. on paraffin, just overhauled; offers.—215, Kingston Rd., Wimbledon, S.W.19. [7719

INDIAN Combination, 1914, 7-9h.p., Empress sidecar, 2 horns, electric lighting, foot and hand clutch combined, splendid condition; £45.—Greenwood, 18, Duke Rd., Chiswick. [7646

7-9h.p. 1915 Indian Combination (little used), 1914 Douglases, Clyno, Rexes, Humbers; large stock to clear.—Parish's Motor Exchange, Corporation St., Preston. Tel.: 113. [X7340

INDIAN, 7-9h.p., 1915 road racer, very fast, clutch, Stewart speedometer, tools, etc., £35; also Binks 3-jet carburetter, 1916, 35/-.—Bowden, 66, Greenvale Rd., Eltham, S.E.9. [7663

7-9h.p. Indian, 1916, very little used, in perfect condition, fast and powerful machine, sidecar fitted with hood and screen, etc.; complete £90.—Hillcoat, Grand Hotel, Dover. [7450

INDIAN 1915 5h.p. Twin, 3-speed, good as new, with Burbury sidecar, hood, screen, run about 900 miles; price £70; owner disabled.—Lieut. Robert, Prince of Wales' Hospital, Marylebone, London. [7643

1915 5-6h.p. Indian Motor Cycle and Sidecar, No. 30, G 096. Rally wheel disc covers, Headstrom improved carburetter, tyres practically new, 3-speed gear, very little used, very fast; £65.—Ernest Moore, Nantwich. [7357

James.

1916 James, 4½h.p., 3 speeds, lamps, etc.; £50.—16, York St., Dover. [7703

JAMES, 1916, 3½h.p. twin, 3-speed, bottom bracket gear, hand clutch, kick starter, as new, completely encased chain drive, ridden under 600 miles; reasonable offer considered; photo 3d.—Liddell, c/o Dallas, Millgate, Cupar, Fife. [X7365

J.A.P.

J.A.P. New 8h.p. Twin Matchless Combination, Bosch mag.; £40.—157, Brixton Hill, S.W. [7660

J.E.S.

J.E.S. Motor Cyclette, complete, 22in. frame, 26in. wheels, practically new; £22, bargain.—Mason, Eastfield, Haxby, York. [X7382

Levis.

LEVIS, 1915 model, 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

LEVIS, 2¼h.p., 1916, excellent condition, new back cover; 21 gns.—Nunns, 7, Broomsleigh St., N.W.6. [X7383

LEVIS, 1917 model, new machine, slightly shop-soiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St., Ledbury. [X7263

LEVIS, latest type, 2 speeds, 2-stroke model; immediate delivery for work of National importance; £47/10.—Maudes', 100, Gt. Portland St., London, W.1. [6110

1915 2½h.p. Levis, single-speed, fast, 90 m.p.g., little and carefully used, excellent condition, £20; wanted, 4 or 4¼h.p. coach combination; appointment Saturday or Sunday.—Monk, 52, Leighton Gardens, Kensal Rise, N.W.10. [7723

Matchless.

1915 Matchless Combination, 8h.p., M.A.G. lamps, horn, good mechanical order; £70.—Below.

WE can give immediate delivery from stock of the W.O. Matchless Combination, 8h.p. J.A.P., spare wheel complete; £125.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

MATCHLESS War Model Combination, with spare wheel and tyre; I have two at £125 each; trade enquiry entertained; seen by appointment.—1a, Bloomfield Rd., Plumstead, S.E.18. [7664

MATCHLESS.—Early deliveries of 8h.p. J.A.P. war model combination, spare wheel; £125; exchanges arranged. Now booking post-war deliveries.—Maudes', 100, Gt. Portland St., London, W.1. [7737

Minerva.

MINERVA 4h.p., mag., torpedo tank, very fast; 10 gns.—14, Glenelg Rd., S.W.2. [7696

New Imperial.

CROW Bros., Guildford.—New Imperial, all models, new and second-hand, in stock. [5371

NEW Imperial-Jap, 8h.p., 3-speed War Model combination; 109 gns.; delivery from stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3521

NEW Imperial Motor Cycles.—2-speed, standard, and lady's models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

2¾h.p. A.J.S., 3-speed, fully equipped, like new; £46/10.—15, Rustic Av., Streatham, S.W.16. [7642

A.J.S.—Four 1915 6h.p. A.J.S. combinations; £75-£81. See advert., page 15.—Maudes', Gt. Portland St., London [7741

LATE 1914 6h.p. A.J.S. Combination, beautiful sidecar, excellent condition; 56 gns.—436, Whitehorse Rd., Thornton Heath. [7711

A.J.S.—Immediate delivery of Military Model, 700×80 tyres, detachable wheels; £91/6.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3520

1916 A.J.S., 2¾h.p., 3-speed, T.T. bars, Lucas horn absolutely as new.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

A.J.S., 1916, T.T., 2¾h.p., 3-speed, hand controlled clutch, kick starter, all enclosed chain drive, fully equipped; sacrifice £45; absolutely perfect.—Halton, 16, Stour St., West Bromwich, Staffs. [7676

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4947

Alldays.

ALLON, 2¾h.p., 2-stroke, 2 speeds, hand clutch, lamps; bargain, 26 gns.; any trial.—39, Crewdson Rd., Clapham Rd., London, S.W. [7715

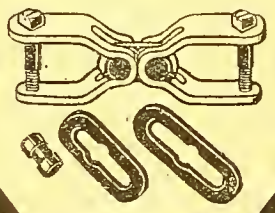
A sure Shield against Breakdowns

FORWARD fasteners never fail—their strength is exceptional, and quality the keynote of their manufacture.

Never take any risk with other kinds when pence only will secure for you the safest, soundest fastener in the World—the one that never fails—The

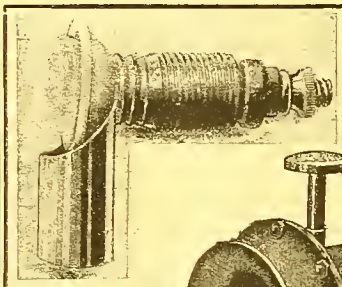
FORWARD

FORWARD MOTOR Co., Forward Works, Summer Row, BIRMINGHAM.

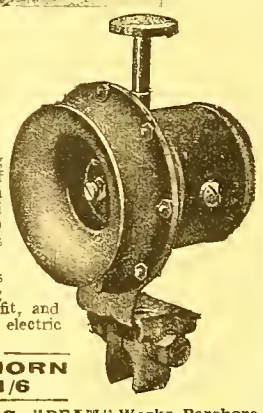


The Forward Price 1/6

r662



ELECTRIC ADAPTER, Price 4/9 each. Spare Bulbs 1/2 each.



This is a small fitting to enable owners of gas lamps fitted with burners of the Roni type (round stem) to make their lamps into electric.

The "adapter" fits over the existing burner with a tight fit, and is connected to an electric wire and battery.

BRITISH HORN Price 21/6

F.R.S. LAMPS, "BEAM" Works, Pershore Street, BIRMINGHAM.

ROSCO CYLINDER BLACK.

PRESERVES YOUR CYLINDERS.

Tins, 6d. Tins, 1/- Withstands Heat. Post Free, 3½d. Post Free, 1/3½

Sole Manufacturers:

OWEN BROS., HULL, Eng.

DEFENCE OF THE REALM A

Under the provisions of the above advertisers requiring workmen, and w business consists wholly or mainly engineering or the productions of munit of war, or substances required for the duction thereof, and whose works situated within 30 miles of London, m include in every such advertisement words, "No person resident more tha miles away, or already engaged on Gov ment work, will be engaged."

Advertisers whose works are situ more than 30 miles from London can have their announcements inserted the approval of the Board of Trade, will allocate to each advertisement a number, and collect and distribute to advertiser all replies received. The ne sary forms of application can be obta from any Labour Exchange or from offices of this paper, and each advert ment must contain a clear reference to effect that no person already engage Government work need apply.

MOTOR CYCLES FOR SALE

Ariel.

CROW Bros., Guildford, Ariel agents.—New a hauled second-hand models in stock.

Bradbury.

4h.p. Bradbury, sidecar, 3-speed, perfect co any trial.—Wickens, Hollingbourne, Kent.

4h.p. Bradbury Combination, free engine, guaranteed perfect order, first-class conditi send on approval, deposit.—Box 2,229, c/o *Cycle.*

Brough.

1916 3½h.p. T.T. Brough, only done 2,00 very fast, perfect condition, speedomete etc.; 49 gns.—Lieut. Loyd, 1, Ovington Garde don.

1916 (late) Brough, Sturmey 3-speed com original tyres, very fast, lamps; any tri exchange Harley or Henderson, cash either way Matlock Bath, Derbyshire.

B.S.A.

4¼h.p. 1915 B.S.A. Canoelet Combination, shaft, all equal new; £50.—Palmer's Tooting.

B.S.A., 1916, 4¼h.p., 3 speeds, large undersl car, lamps, very smart; £65, offer, excha Beauval Rd., East Dulwich.

B.S.A. 1913 Combination, C.B., 2-speed, speedometer, lamps; exchange big twin £30.—7, Linda St., Battersea.

B.S.A., 1913, free engine, clutch, pedal st tyres, very good condition; £20.—W. Heather Band Lodge, Hindhead, Surrey.

1915 B.S.A., Model K., excellent order, ve appearance, lamps, mirror, Lucas ho £40.—Pearce, Westonville, Great Missenden.

B.S.A., late 1913, 3½h.p., 2-speed, free engin sidecar, Lucas lamps, horn, etc., splendid order and condition; £35, or nearest offer.—W Chemist, Burnham-on-Sea.

B.S.A., 1916, chain drive, 3-speed, kick star slung coachbuilt sidecar, speedometer, accessories, excellent condition; £55.—Charlton Shooters Hill Rd., Woolwich, S.E.18.

B.S.A., 1915, 4¼h.p., 3-speed, etc., sidecar, grid, speedometer, and all accessories, as new, not used for past 2 years; owner joi £50, no offers.—C. W. Fish, Rawcliffe, Goole.

B.S.A., 1914, I.O.M. T.T., genuine, like new, 2,000 miles, 3-speed countershaft, chain driven, foot oil pump, tyres, enamel, plating lamps, generator, mechanical horn, knee pads, teed in new condition throughout; offer.—E. M Princess Rd., Kilburn, London.

B.S.A. Combination, 1914, 3½h.p., clutch mo starter, condition as new, just overhauled of £10, new tyres, belt, etc., lamps, generato torpedo sidecar, brand new Phœnix; sacrifi owner going France; evenings 7-9, or week-en pointment.—Holvoet, 141, Goldhurst Terrace, stead, N.W.6.

Calthorpe.

CALTHORPE Lightweight, 2½h.p. J.A.P., gear; £24.—Exeter Motor Cycle Co., Lt Rd., Exeter.

CALTHORPE Junior, 2-speed, guaranteed per good condition; £22.—136, Harrington Norwood, London, S.E.

MOTOR CYCLES FOR SALE.

Calthorpe.

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

Chater-Lea.

CHATER-LEA Combination, 8h.p., coachbuilt sidecar, splendid condition; no dealers; also Douglas. —270, High Rd., Chiswick. [7701

Coventry Eagle.

2¾h.p. 1918 Coventry Eagle, 2-speed lightweight, as new, only run 40 miles; £52.—Palmer's Garage, Tooting. [7682

Douglas.

DOUGLAS.—Prompt delivery to those on work of National importance.—Gibb, Gloucester. [4749

DOUGLAS, 1912, 2¾h.p., 2-speed, wants tuning; bargain, £16.—Wilson, 66, West Sq., S. Farnborough, Hants. [7702

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS T.T., 1914, fast, new tyres, long exhaust; snip, £30.—Lt. Hellett, R.A.F., 8, St. Nicholas Rd., Brighton. [7709

DOUGLAS Motor Cycles.—We can supply by return 1918 models on receipt of permit.—Eli Clark, the Douglas agent, 196, Cheltenham Rd., Bristol. [0923

DOUGLAS, 2¾h.p., 1913, 2-speed, semi T.T. bars, new frame, in sound condition, with horn and speedometer; £25.—Box L6,891, c/o *The Motor Cycle*. [7465

DOUGLAS Motor Cycle, with sidecar, 1914, 2¾h.p., excellent condition.—W. Barrington (Garage), 301, North End Rd., W. Kensington. 'Phone: Ken. 4680. [7647

NEW Douglas Motor Bicycles.—The latest 2¾h.p. models for instant delivery for those engaged on work of National importance against permits. How and where to obtain them, fullest particulars and prices, apply to Robinson's Garage, Green St., Cambridge. [7707

1918 4h.p. Douglas Combination, chain drive, one-lever carburetter, interchangeable wheels, the latest in every respect, with special coach sidecar, hood, screen, and spring wheel, 3 lamp sets, Cowey speedometer, horn, in perfect condition, driven a few miles only for demonstration purposes.—Prices and particulars, Robinson's Garage, Green St., Cambridge. [7708

Enfield.

ROYAL Enfield 1914 2¾h.p. Twin, 2 speeds, chain drive, splendid condition; £16.—175, Stockwell Rd., Brixton. [7716

ENFIELD 3h.p. Twin, 66 gns.; touring and T.T. models in stock.—Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3522

ENFIELD, 2¼h.p., 1911, just overhauled; £13; exchange 1913 Douglas 2-speed.—Box L6,957, c/o *The Motor Cycle*. [7725

1915 (very late) Enfield Combination, 6h.p., lamps, horn, splendid condition; £80.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

1916 Royal Enfield Combination, 6h.p., lamps, horn, Jones speedometer, screen, in good condition; £75, or exchange for small car, cash adjustment either way; callers only.—J. R. Canty, Crocken Hill, Swanley, Kent. [7633

ENFIELD 3h.p. and Watsonian lightweight sidecar, new condition; £34, or Douglas in exchange.—Blackburn, 22, Model Cottages, East Sheen, S.W.—Appointment only. [7691

ENFIELD, 1914, 6h.p., 2-seater sidecar, £60; 1915 6h.p. combination, £70; ditto, £72; 1916 8h.p. combination, 2-seater sidecar, £82; 1914 3h.p., 2-speed, twin, £25.—Maudes', 100, Gt. Portland St., London, W.1. [7738

LATE 1916 Enfield 6h.p. Combination, T.T., disc wheels, sporting sidecar on Enfield chassis, mileage 3,500, 3in. tyre on back wheel, Lucas head light, electric rear light; £80; seen Coventry.—Box 2,228, c/o *The Motor Cycle*. [X7406

Harley-Davidson.

7-9h.p. 1915 Harley-Davidson Combination, full electrical equipment, as new; £70.—Palmer's Garage, Tooting. [7630

1917 Harley-Davidson and Sporting Torpedo Sidecar, lamps, horn, very nice condition; £110.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

HARLEY-DAVIDSON.—We have three Harley-Davidson combinations on offer, 1916 and 1917. See advert., page 15.—Maudes', Gt. Portland St., London. [7739

1915 Harley-Davidson, thoroughly overhauled and repainted olive green, unused; genuine bargain, £55.—Hoban, c/o D. Billing, Gt. Chapel St., Oxford St., W.C. [7634

60 Gns, complete.—Late 1915 Harley-Davidson combination, like new, been stored; a real bargain; seen and ridden any time.—Miller, 62, Hampstead Rd., N.W.1. [7699

ALL GUARANTEED
ALL RELIABLE
ALL READY

to ride away immediately. We can arrange repurchase if required for men on leave able to get a petrol permit.

RUNABOUTS AND CARS.

MORGAN, 1915, G.P., being repainted	£128
MORGAN, 1917, M.A.G., de luxe, helio. finish, discs	£139
MORGAN, 1916, G.P., dark red, disc wheels	£130
MORGAN, 1914, G.P., 80 mm. tyres, all lamps	£105
MORGAN, 1917, G.P. J.A.P., finished dark green	£135
MORGAN, 1917, G.P., water-cooled M.A.G., as new	—
MORGAN, 1916, G.P., M.A.G., discs, dark red	£140
MORGAN, 1916, G.P., J.A.P., discs, dark blue	£130
SWIFT, 1914, 7-9 h.p., standard model	£135

SIDECAR COMBINATIONS.

SUNBEAM 1914 6 h.p. Combination	£70
ZENITH, 1914, 4-5 h.p., Gradua countershaft gear	£45
INDIAN, 1915, 7-9 h.p., 3-speed, as new	£72
HARLEY-DAVIDSON 1917 2-seater Combination	£128
HARLEY-DAVIDSON 1917 8 h.p. Combination	£125
HARLEY-DAVIDSON 1916 Combination, electric	£76
ENFIELD 1915 6 h.p. Combination spring handlebars	£70
ENFIELD 1915-16 6 h.p. Combination, all accessories	£72
ENFIELD 1914 6 h.p. Combination, 2-seater Sidecar	£60
ENFIELD 1916 8 h.p., 2-seater Sidecar	£82
A.J.S., 1915, 6 h.p., spare wheel, speedometer	£81
A.J.S., 1915, as above, but less screen	£79
A.J.S., 1915, less speedometer and spare wheel	£75
A.J.S., 1915, 6 h.p., all lamps, horn, and tools	£77
MATCHLESS, 1918, 8 h.p. M.A.G. model, hardly used	£164
MATCHLESS 1918 war model, £10 of accessories	£120
MATCHLESS, 1917, 8 h.p. M.A.G., Lucas dynamo, as new	—

SOLO MACHINES.

RUDGE, 3½ h.p., special Isle of Man Model	£40
ZENITH, 1917, 4-5 h.p., condition like new	£52
CONSUL VILLA, 1916, 2-speed, 2½ h.p., 2-stroke	£34
A.B.C., 1914, special Isle of Man engine	£75
TRIUMPH, 1908 (Dec.), touring model	£17
TRIUMPH, 1913, 3½ h.p., clutch model, as new	£20
ENFIELD, 1912, 2¾ h.p., 2-speed, chain drive	£21
ENFIELD, 1914, 3 h.p., 2-speed twin, M.A.G. engine	£25
RUDGE, 1912, 3½ h.p., fixed gear, picked engine	£20
LEVIS, 1917, shop-soiled, 2-speed, 2-stroke	£46

LISTS GIVING FULLER PARTICULARS UPON REQUEST.

MAUDES' MOTOR MART,

100, Great Portland Street, LONDON - - - - - W.1.

Telephone - - - - - - - - 552 Mayfair.
Telegrams - - - Abdicate, Wesdo, London.

MOTOR CYCLES FOR SALE.

Humber.

1916 Humber Combination, 4½h.p., water-cooled, 3-speed, clutch, kick starter, Millford sidecar, all in new condition, very little used; £50, or near offer.—Robertson, 39, Pulborough Rd., Southfields, Wandsworth. [7672

Indian.

INDIAN 1916 Powerplus Sporting Combination, 3-speed, clutch, etc., due order; £70. 54, Stroude Rd., Willesden, N.W. [7693

INDIAN Combination, 7-9h.p., 2 speeds, kick start, 90 m.p.g. on paraffin, just overhauled; offers. 215, Kingston Rd., Wimbledon, S.W.19. [7719

INDIAN Combination, 1914, 7-9h.p., Empress sidecar, 2 horns, electric lighting, foot and hand clutch combined, splendid condition; £45.—Greenwood, 18, Duke Rd., Chiswick. [7646

7-9h.p. 1915 Indian Combination (little used). 1914 Douglases, Clyno, Rexes, Humbers; large stock to clear.—Parish's Motor Exchange, Corporation St., Preston. Tel.: 113. [X7340

INDIAN, 7-9h.p., 1915 road racer, very fast, clutch, Stewart speedometer, tools, etc., £35; also Banks 3-jet carburetter, 1916, 35/-.—Bowden, 66, Greenvale Rd., Eltham, S.E.9. [7663

7-9h.p. Indian, 1916, very little used, in perfect condition, fast and powerful machine, sidecar fitted with hood and screen, etc.; complete £90.—Hillcoat, Grand Hotel, Dover. [7459

INDIAN 1915 5h.p. Twin, 3-speed, good as new, with Burbury sidecar, hood, screen, run about 900 miles; price £70; owner disabled.—Lieut. Robert, Prince of Wales' Hospital, Marylebone, London. [7643

1915 5-6h.p. Indian Motor Cycle and Sidecar, No. 30, G 096. Rally wheel disc covers, Hendstrom improved carburetter, tyres practically new, 3-speed gear, very little used, very fast; £65.—Ernest Moore, Nantwich. [7357

James.

1916 James, 4½h.p., 3 speeds, lamps, etc.; £50—16, York St, Dover. [7703

JAMES, 1916, 3½h.p. twin, 3-speed, bottom bracket gear, hand clutch, kick starter, as new, completely encased chain drive, ridden under 600 miles; reasonable offer considered; photo 3d.—Liddell, c/o Dallas, Millgate, Cupar, Fife. [X7365

J.A.P.

J.A.P. New 8h.p. Twin Matchless Combination, Bosch mag.; £40.—157, Brixton Hill, S.W. [7660

J.E.S.

J.E.S. Motor Cyclette, complete, 22in. frame, 26in. wheels, practically new; £22, bargain.—Mason, Eastfield, Haxby, York. [X7382

Levis.

LEVIS, 1915 model, 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

LEVIS, 2¼h.p., 1916, excellent condition, new back cover; 21 gns.—Nunns, 7, Broomsleigh St., N.W.6. [X7383

LEVIS, 1917 model, new machine, slightly shop-soiled, 2¼h.p., 2-speed gear; £45.—Hopkins, New St, Ledbury. [X7263

LEVIS, latest type, 2 speeds, 2-stroke model; immediate delivery for work of National importance; £47/10.—Maudes', 100, Gt. Portland St., London, W.1 [6110

1915 2¼h.p. Levis, single-speed, fast, 90 m.p.g., little and carefully used, excellent condition, £20; wanted, 4 or 4½h.p. coach combination; appointment Saturday or Sunday.—Monk, 52, Leighton Gardens, Kensal Rise, N.W.10. [7723

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MATCHLESS.—Early deliveries of 8h.p. J.A.P. war model combination, spare wheel; £125; exchanges arranged. Now booking post-war deliveries.—Maudes', 100, Gt. Portland St., London, W.1. [7757

Minerva.

MINERVA 4h.p., mag., torpedo tank, very fast; 10 gns.—14, Glenelg Rd., S.W.2. [7626

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NEW Imperial Motor Cycles.—2-speed, standard, and lady's models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0932

MOTOR CYCLES FOR SALE.

Norton.

NORTON Big Four, all chain drive; £82/10; in stock. —Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [3524

N.S.U.

HAVING Acquired the entire stock-in-trade of the N.S.U. Motor Co., Ltd., we can supply spares for practically all types of N.S.U. motor cycles. In ordering it is important to submit old parts as patterns.—Eagles and Co., Acton Hill Works, Acton, W 3. [0739

P. and M.

P. and M. and Coachbuilt Sidecar, 2-speed, free engine, thorough going order; £25; seen by appointment. —Colebrooke, 2, St. James's Rd., Watford. [7648

Premier.

PREMIER, 3½h.p., 3-speed, and clutch, completely overhauled and re-enamelled; £35.—160, Askew Rd., Shepherd's Bush. [7674

PREMIER, 2½h.p., 1916, lightweight, as new, 4-stroke engine, Bosch mag., splendid tyres, been stored 18 months; £25 cash.—Bowden, 66, Greenvale Rd., Eltham, S.E.9. [7669

1912-13 Premier M.C., 3½h.p., Armstrong 3-speed hub, little used, splendid order, scarcely scratched; best offer over £20, cash only; owner has no further use for same.—William Harrison, Front St., Quebec, Co. Durham. [X7407

Rover.

ROVER, Sturmey 3-speed, unscratched, with Lucas horn and lamps and tools, £29/10; sidecar, £5; photo on request.—20, Forrest St., Latchford. [X7008

3½h.p. Rover Combination, late 1916, low mileage, complete outfit, first-class accessories and spares; 59 gns.—Kennard, 18, Myddleton Sq., Clerkenwell. [X7384

ROVER, 3½h.p., 3-speed, pedal starting, Rover coach-built sidecar, with brake, all accessories, including speedometer, in splendid condition; £50, or near offer.—Box L6,937, c/o *The Motor Cycle.* [7645

ROVER Motor Cycles.—3½h.p. and 5-6h.p. models in stock for immediate delivery, both solo and side-car outfit; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0954

Rudge.

RUDGE, 1913, 3½h.p., free engine, clutch, good appearance, excellent condition; quick sale £15.—Charlton Kennels, Shooters Hill Rd., Woolwich, S.E.18. [7637

Sunbeam.

1916 3½h.p. Sunbeam and Milliord Sidecar, lamps, horn; £85.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

1915 6h.p. Sunbeam Combination, Lucas dynamo lighting, spare wheel, hood, screen, speedometer, watch, only done 5,000 miles; bargain, £97/10.—36, De Laune St., Kennington, S.E.11. [7659

Triumph.

3½h.p. Triumph, 3-speed, sidecar; £22; will separate. —90, Albion Rd., N.16. [7713

TRIUMPHS (two), one clutch, one T.T., splendid condition; joining up; £32 two.—1, Tarver Rd., Walworth. [7735

TRIUMPH, 1914, 4h.p., 3-speed, clutch, accessories, splendid order, £38; with coachbuilt sidecar £45. —J. Thirlby, Littleover, Derby. [X7411

MOTOR Cycle, Triumph, 3½h.p., 1913, clutch, speedometer, horn, watch, head lamp, complete kit of tools, only ridden 4,000 miles, good as new; price £35. —Pitchford, Talbot Hotel, Shifnal. [X7370

TRIUMPH, 1914, 4h.p., 3 speeds, clutch, adjustable pulley, head lamp, generator, Klaxon horn, tools, etc., engine recently specially tuned up by makers, very fast and reliable, good tyres; £45; seen Luton.—Capt. H., Box 2,227, c/o *The Motor Cycle.* [X7371

TRIUMPH, 1914, single speed, fixed engine, done 5,000 only, enamelling and plating as new, carefully kept, do 67 m.p.h., guaranteed throughout; £35, or close offer.—Fairholme, Coulsdon Rd., Caterham. [7650

TRIUMPH, 1913, cane canoelet sidecar, F.E., 3-speed, clutch, lamps, horn, tools, spare valves, new Clincher and tube back, others nearly new; bargain, £40; or exchange with cash for late Enfield; must be perfect.—Brooks, Bootmaker, Bridget St., Rugby. [X7369

Velocette.

2½h.p. Velocette, splendid condition; £20.—Lieut. Wraight, c/o 12, Corn St., Witney, Oxon. [7673

Vindec.

VINDEC Combination, 6h.p., 2-speed countershaft, handle starting; owner joined Army; £16.—1, Tarver Rd., Walworth. [7734

Zenith.

ZENITH, 1914, 8h.p. T.T. model, disc wheels, lamps, horn, new condition; £30.—54, Strode Rd., Willesden, N.W. [7692

ZENITH, 6h.p., late 1914 combination, countershaft, kick starter, clutch, J.A.P. engine, very fast, first-class condition; £55, offers.—59, Sutton Rd., Muswell Hill. [7635

THIS WEEK'S BARGAIN:

Latest Model T.T. ROVER, with Philipson pulley, slightly shop-soiled; Rover's cash price £67 10 0
Special cash discount 15% £10 2 6
£57 7 6

Also the following NEW machines, latest models in stock, all of which can be supplied without permits:

NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed .. .. .. 44 gns.
LEVIS, 2½ h.p., single-speed 35 gns.
LEVIS, 2½ h.p., 2-speed .. £47/10
***LEVIS** Popular, 2-stroke .. £32 0
ROVER, W.O. model, 5-6 h.p. J.A.P., and Sidecar £124/5
ROVER, T.T., Philipson pulley £67/10
ROVER, 3-sp., kick-st., clutch £80 0

SECOND-HAND.

1917 **NEW IMPERIAL-J.A.P.,** 2½ h.p., 2-speed 35 gns.
1916 **ENFIELD,** 3 h.p., 2-sp. 42 gns.

*Permit required for this machine.

JULIAN, 84, Broad Street, READING.

Biggest Light Car and Motor Cycle Dealer in the South.
'Phone: 1024. Closed Wednesdays 1.

Instructions for amateurs to enamel *a motor cycle.*

A copy of our new leaflet entitled "Instructions for Amateurs to Enamel a Motor Cycle with Robbialac" will gladly be sent to those giving the name of their nearest accessory dealer. Write Jenson and Nicholson, Ltd., Publicity Dept., Robbialac Works, Stratford, London, E.15.

ROBBIALAC IS SOLD BY ALL ACCESSORY DEALERS.

ROBBIALAC

MOTOR CYCLES FOR SALE.

Zenith.

ZENITH, 1914, 6h.p., Swan sidecar, exceptional dition, do 70 m.p.h.; £47.—51, Maplethorpe Thornton Heath. [7

1915 Countershaft Zenith 5h.p. Combination, cellent condition; £55; exchange Enfield Douglas combination; no rubbish.—3, Sherborne Yeovil. [7

Miscellaneous.

N.S.U., twin-cyls., mag., sidecar, etc.; £12/10; on rail; also New Hudson lightweight for disp —G.L., c/o Oak Lodge, Brook Lane, Sarisbury Gr Hants. [7

MOTOR Agents.—I have in stock for immediate livery new motor cycles: Rover, New Imper Calthorpe, James, Connaught, and Hockley. No perm required. Let me quote.—P. J. Evans, 91, John Bri St., Birmingham. [0

SPECIAL Bargains.—7-9h.p. Harley-Davidson 1 combination, £59/15; 2h.p. N.S.U. lightweight, speed, £10; 1913 P. and M., £29/15; 1914 4½ B.S.A. combination, £39/15; 3½h.p. 1913 Humber speeds, £25/5; 1916 Allon, 2 speeds, clutch, £35/ 3½h.p. 1912 Rudge, Grado gear, £16/15; 6h.p. 1 Rudge, Multi gear, big single, £29/15; 4h.p. 1911 B bury combination, £18/15; 6h.p. 1909 Rex, £11/1 3½h.p. 1910 Rex, low riding position, £11/15; 3½ 1911 Humber, 2 speeds, £18/15; 2¾h.p. 1916 T.D £15/15; 2¾h.p. 1915 Douglas, 2 speeds, £32/15; s stamp for detailed list.—Booths Motories, Portland Pl Halifax. Tel.: 1062. [7

RIDER TROWARD and Co. offer the follow machines for low cash or exchange figures, full details and list free: Allon, American Excelsior, Ar Bat-Jap (2), Bradburys (5), B.S.A.'s (2), British celsior, Connaught, Coventry Eagle, Campion, Calthor (7), Douglas (9), Enfields (2), F.N.'s (2), Grand Hobart, Humbers (3), Harley, Harris-Peugeot, Indi (10), James (3), J.H., Kerry-Abingdons (3), Linco Elks (2), Levis, Matchless (2), Minerva, Metro, Mo sacoche, N.S.U., New Imperials (2), Nut-Jap, New H sons (3), O.K.-Jap, O.K.-Precision, P. and M., Premi (10), Precision, Quadrants (2), Rovers (2), Rex Rudges (14), Sun-Villiers (5), Sheffield Minor, Sing (2), Scotts (3), Sunbeam, T.D.C., Triumphs (12), Velo Velocette, Wolf, Williamson, Whiting, Wooler, a Zeniths (15).—31, 40b, and 78, High St., Hampstead [77

£10 to £20 purchases any of the undermention machines, all of which are guaranteed in ru ning order: Minerva, 3½h.p., 9 gns.; Bat-Jap, 3½h. 2-speed, 13 gns.; Bat-Jap, 5-6h.p., 2-speed, 14 gn Douglas, 1911, 12 gns.; F.N., 4-cyl., 13 gns.; Triump 1911, 3½h.p., 13 gns.; Bradbury, 1912, 3½h.p., speed, clutch, 19 gns.; Calthorpe, 1916, 2-stroke, sing speed, 18 gns.; Connaught, 2-stroke, 17 gns.; Dougla 1911, 2-speed, 17 gns.; Grandex-Precision, 1913, 3 h.p., 2-speed, clutch, 19 gns.; Lincoln Elk, 191 3½h.p., variable gear, waterproof Bosch, 19 gns Rex, 1912, 6h.p., 2-speed, clutch, 19 gns.; Su Villiers, 2-stroke, 17 gns.; Singer, 1914, 2¼h.p., T.T clutch, 18 gns.; Humber, 1914, 2½h.p., lightweigh 16 gns.; Triumph, 1911, 3½h.p., 2-speed, clutch 17 gns.; Wolf, 1915, single-speed 2-stroke, 19 gn Full details on request.—Rider Troward and Co., 3 High St., Hampstead. [773

BARGAINS.—Our premises will shortly be taken f munitions, and the whole of our stock must b cleared. Close cash offers considered. 1915 A.J.S £79/10; 3½h.p. A.S.L., £14/10; 1914 6h.p. Bradbu and sidecar, £55; 1913 3½h.p. 3-speed Bradbur £29/10; 2¾h.p. Diamond, £25/10; 1914 2-speed Dou las, £34/10; 1915 6h.p. Enfield combination, £72/10 1916 Harley-Davidson combination, £82/10; 7-9h.p twin Indian, £23/10; 4h.p. 2-speed Indian, £22/10 1914 7-9h.p. Indian and sidecar, £42/10; 1914 Lincoln Elk and sidecar, £45; 3½h.p. N.S.U. and new coac sidecar, £26/10; 1915 2-speed Radco, £22/10; 3½h.p Roach and new coach sidecar, £24/10; 5-6h.p. Rudg Multi and sidecar, £45; 3½h.p. Tourist Rex, £12/10 2¾h.p. 3-speed Rex, £22/10; 2-speed twin Rex, £18/10 6h.p. Rex twin, m.o.v., £14/10; 1914 6h.p. Rex an coach sidecar, £46/10; 2h.p. 2-speed Velocette, £25/10 2¾h.p. 1915 2-speed kick start Wolf, £27/10; 8h.p Morgan, hood, screen, lamps, £72/10; 1914 Perry, 2 seater, £125; 1914 10h.p. Stellite, 200 gns.—Motor Ex change, Horton St., Halifax. [766

Ladies' Motor Cycles.

LADY'S 3-speed Humber, speedometer, tools, etc., in distinguishable from new; £25. Wanted, combina tion.—37, Arlington Rd., Surbiton. [767

LADY'S 2¾h.p. New Imperial-Jap, 1916, 2-speed kick starter, small mileage, all accessories; £35.— Patey, Windlecote, Heath House Lane, Brookwood. [773

SIDECAR ATTACHMENTS.

FARLOW Sidecars.—Great stock-taking sale; shop soiled models at big reductions.—Below.

SHOP-SOILED Sidecar Chassis, 20 only, complete with tyre and quick detachable joints; £4/4 each; can not repeat.—Below.

SIDECAR Stands, kick-up model, 3/6; sidecar quick detachable joints, 1/6; sidecar mudguard blades, enamelled black, 2/-.—Farrar's Motories, Hopwood Lane, Halifax. [734

LIGHTWEIGHT Campion Coach Sidecar and fittings, complete, as new; £7.—Box 2,226, c/o *The Motor Cycle.* [X734

SIDECAR ATTACHMENTS.

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good stock of second-hand sidecars at moderate prices. [7628

COACH Sidecar, new steel body, complete, £3/15; also light torpedo metal body, new, 30/-; exchange speedometer.—112, Ridley Rd., E.7. [7655

RENNOC Sidecars are manufactured at the Rennoc Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4.

RENNOC Sidecars are designed and manufactured under the personal supervision of Mr. George Conner, 14 years manager to the Phœnix Sidecar Co.

RENNOC Sidecars.—We supply lugs, rims, spokes, upholstering material, tubing, springs, and all fittings for any make sidecar.

RENNOC Sidecar Bodies, hoods, screens, wheel discs, etc.; actual manufacturers, wholesale, retail, and export.

RENNOC Sidecars.—We specialise in frame repairs to motor cycle and sidecars, enamelling and plating.

RENNOC Sidecars.—Special department for sidecar body repairs, repainting, upholstering, lining, etc. Get into communication with our Mr. Conner. It will pay you. [7436

SIDECARS.—New Swan torpedo, £25; new James canoelet, £18/18; or by extended payments.—Service Co., 292, High Holborn, W.C.1. [7431

WASTONE'S for Sidecars and Bodies.—Various models in stock; inspection invited; right prices. 228, Pentonville Rd., King's Cross, London, N.1. Tel.: 2481 North. [7406

NEW Underslung Chassis, £3/10/6; good cane sidecar, closed type, £2/15/6; new light coach sidecar, £7/19/6; front detachable joints, 1/9; T, elbow, and clip lugs, 5d.; large quantity steel tubing; or ordinary pattern sidecar springs, 7/6 pair.

CORONET Sidecars, to fit any make of machine; a few shop-soiled models to be sold at special prices stamp for list.—Booths Motories, Halifax. [7296

HOODS, WIND SCREENS, ETC.

RENNOC Motor Sidecar and Engineering Works certainly lead in price, quality, and design of hoods, screens, aprons, etc.—86, Victoria Rd., Stroud Green, London, N.4. [7434

WIND Screens.—The Standard, 27/6; folding top, 32/6; double side wing screen, 45/-; the Fitall, 9/6; the fixed, 19/6; the Orto, 33/-, 55/-, and 60/-; the Emels, 42/-; the Walbro, 36/-; fawn waterproof hoods, with strong wood frames and plated fittings, 37/6, 47/6, and 57/6.—Juno Showrooms, 248, Bishopsgate, London. [6896

BODIES.

CANE Sidecar Bodies.—Several to clear at 50/- each, worth £5. Write for design.—The Willowbrook Co., Leicester. [0901

RENNOC Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4, are actual manufacturers, also have few clearance and second-hand. [7433

WASTONE'S for Sidecar Bodies.—Various models, also sporting and tandem bodies in stock; inspection invited; all at low prices.—228, Pentonville Rd., King's Cross, London, N.1. Tel.: 2481 North. [7405

SIDECAR Body Designs for the trade only. Working, coloured, pencil, or line drawings of original designs, also working drawings full sized or to scale.—Cooper's Vehicle Journal, Ltd., established designers to the coach trade for over 80 years. Consult us when designing new ideas.—20, Tudor St., London, E.C.4. [0818

RUNABOUTS AND CYCLE CARS.

3-10h.p. 1914 Humberette, fully equipped, oversize tyres; £60.—Palmer's Garage, Tooting. [7679

A.C. Sociable, good condition, several spares; £38, or suitable exchange.—G. Deppe, Ridley Villa, New Rd., Hillingdon Heath, near Uxbridge. [7689

MORGAN, 8h.p. J.A.P., complete with hood, screen, and all lamps, speedometer, etc., in almost new condition; £98.—Hopkins, New St., Ledbury. [X7262

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good stock of cycle cars, including Cardens, Morgans, Chater-Lea, G.W.K., etc. [7629

MAUDES' Motor Mart, Gt. Portland St., London, have eight Grand Prix Morgans on offer, 1914-1918; £105-£160. See our advertisement page 15. [7741

A.C. Sociable, recently overhauled, repainted, special low seat and wind screen, hood, front brakes, lamps, little used; bargain, £40.—J. Woodcock, Barton Field, Barton-on-Humber. [X7410

MORGAN, sporting red, disc wheels, hood, screen, Jones speedometer, Binks, J.A.P., lamps, tyres as new; £75.—Mr. Carter, Lacr's Garage, Eccleston Place, Elizabeth St., Victoria, S.W. [X7424

MORGAN, 1917 De Luxe model, complete with hood, screen, C.A.V. dynamo, electric lighting outfit and lamps, absolutely new condition throughout; £150.—Hopkins, New St., Ledbury. [X7261

WE have several water-cooled Grand Prix Morgans in stock; write or 'phone for full particulars.—Slee and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. 'Phone: Avenue 5548. [0480

GET IT AT Taylor's

FOR IMMEDIATE DELIVERY WITHOUT PERMIT.

1916 6 h.p. ENFIELD Combination, lamps and speedometer, fine order £76 0
1915 6 h.p. A.J.S., with new chassis ... £70 0
1915 6 h.p. BRADBURY, countershaft, and cane Sidecar £65 0

NEW SOLO MOUNTS.

2¾ h.p. EXCELSIOR, 2-stroke, 2-speed, and clutch £44 2
2½ h.p. EXCELSIOR-J.A.P., 2-speed, and clutch £48 10

SECOND-HAND.

1915 2¾ h.p. DOUGLAS ..... 39 gns.
1915 2½ h.p. 2-stroke BABY LEVIS .. £25 0
1915 2¾ h.p. HOBART - VILLIERS, 2-stroke, 2-speed, auxiliary tank .. £27 10

PEDAL CYCLES.

Gents' WEARWELL, 22in. and 24in. frames, rubber-studded tyres, latest models, absolutely new £12 12
Ladies' WEARWELL, 20in., 22in., 24in. frames £12 12

H. TAYLOR & CO., LTD.
Showrooms : 21a, STORE STREET, W.C.1.
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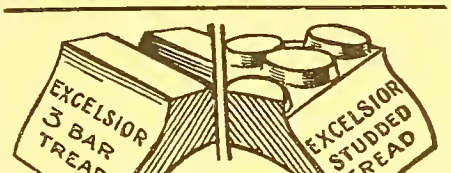
Garage: Tottenham Mews. 'Phone—Museum, 1210. Telegrams—"Dynametro, Westcent, London."



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162 Great Portland St. LONDON W1
DIXIE

FARM TRACTORS AND IMPLEMENTS.

MUST Clear.—Practically new £450 American farm tractor, 4-cyl. monobloc engine, enclosed valves, power pulley, paraffin or petrol; no reasonable offer refused. Call and have a look at it. No obligation.—Douglas S. Cox, the A.S.M.M., 6c, Lansdowne Hill, West Norwood. (See Cars.) [7403

CARS FOR SALE.

15 9h.p. S.C.A.T. Chassis, less tyres and mag; bargain, £40.—Palmer's Garage, Tooting. [7683

11 9h.p. 1913 Arrol-Johnston, 5-seater, runs equal new; £225.—Palmer's Garage, Tooting. [7684

25 h.p. 1913 Napier 6-cyl. Chassis, runs like a Rolls; £275.—Palmer's Garage, Tooting. [7685

12 14h.p. F.I.A.T. London Taxicab, ready for service, new tyres; £150.—Palmer's Garage, Tooting. [7686

G.W.K. Light Car, 1914 model, complete as makers' specification, just repainted and overhauled; £120. —Exeter Motor Cycle Co., Ltd., Bath Rd., Exeter. [0951

1914 Ford Touring Car, fully equipped, electric lights, detachable wheels, new tyres; £95, or combination part.—185, Brighton Rd., South Croydon. [X7409

WE have the following cars for sale for cash, extended payments, or your motor cycle in exchange; Enfield, Alldays, R.M.C., Humberette, Horstmann.—Full particulars on application.—Service Co., 292, High Holborn, London. [7416

LUXURY Tax! Why pay it? Buy immediately. You may be sure that you will not again be able to purchase at these prices for at least two years after peace declaration (sounds well, doesn't it!—it may be nearer than you think!) Remember, all dates in this advert guaranteed accurate. Many of the cars practically new.—2½h.p. O.K. Junior bicycle, 2-speed countershaft, believed 1915, £15; 16-20h.p. N.A.G. chassis, gate, 4-speed, Bosch, S.U., £25; 1-ton chain-driven van, handsome roomy body, £35; 15h.p. Express, torpedo, £40; 15h.p. 1912 Studebaker, torpedo, monobloc, gate, dual, smart, £45; 8-10h.p. Unique parcels lorry, late model, 2-cyl. W. and P. engine, watertight Bosch, pointed radiators, wire wheels, £50; 12h.p. 1914 Buckingham cycle car, streamline 3-seater, all aluminium, £50; 18-22h.p. Bedford-Buick light lorry, gate, dual, £50; 15-20h.p. K.R.I.T., torpedo, monobloc, gate, Bosch, Clandel, £65; 14-16h.p. Belsize 15-cwt. van, £65; 20h.p. 6-cyl. Standard chassis, late model, £75; 15h.p. racing car, actual Brooklands winner, 70 m.p.h., streamline skeleton 2-seater, £75; 15h.p. Charron chassis, monobloc, Zenith, £80; 14-16h.p. Darracq traveller's omnibus, monobloc, gate, Zenith, £85; 8-10h.p. Alldays Midget, Zenith, wire wheels, smartly repainted, £90; 13.9h.p. 1912 Darracq, 4-seater, monobloc, enclosed overhead inlets, gate, Zenith, £100; 8-10h.p. 2-cyl. Renault taxi chassis, £115; 10h.p. 1914 Lagonda coupe, worm drive, monobloc, detachable wheels, smart, £120; type T.M. Daimler 4-stretcher ambulance, runs splendidly, make fine van, £125; 30h.p. National sporting 4-seater, £125; 12-15h.p. F.I.A.T. taxi-landaulet, monobloc, £135; 11.9h.p. 1916-17 Argo, sporting 4-seater, electric starting, dynamo lighting, disc wheels, particularly posh, £135; 8-10h.p. Pearson-Cox steam light car, streamline 2-seater, exceptional condition, £135; 10h.p. Horstmann streamline 2-seater, 4-cyl. monobloc, detachable wheels, pointed radiator, seat starter, £145; 10h.p. 1914 Deemster, streamline 2-3-seater, 4-cyl. detachable wheels, pointed radiator, smart, £145; 20-25h.p. B.S.A. chassis, splendid condition, £150; 12h.p. Siddeley-Deasy, torpedo, enclosed valves, worm drive, detachable wheels, £165; 11.9h.p. Belsize, streamline 2-3-seater, dynamo lighting, monobloc, detachables, £185; practically new £450 American farm tractor (see separate advertisement), £185; Studebaker van, £185; 15h.p. 1913 Star ¾ landaulet, long stroke engine, enclosed valves, detachable wheels, £235; 16-20h.p. Sunbeam 5-seater, enclosed valves, 4-speed, detachable wheels, runs splendidly, £285; 3-ton De Dion commercial chassis, latest round radiator type, enclosed valves, worm drive, steel wheels, £300; 15-22h.p. R.M.O. interior drive cabriolet-saloon, dynamo lighting, streamline, monobloc, detachables, particularly smart car, £350; 15h.p. Sunbeam streamline torpedo, dynamo lighting, monobloc, enclosed valves, detachable wheels, smart, £385; another, 3-ton De Dion, similar to above, but better, £385 (£650 the two); 25-30h.p. Vauxhall chassis, 6-cyl. monobloc engine, detachable wheels, pointed radiator, £450.—Douglas S. Cox, the absolutely straight motor man, has all the above cars actually in stock and on view. Please call. Hours 8 to 6.30. Saturdays 2. No business Sundays.—Douglas S. Cox's Motor Clearing House, 6c, Lansdowne Hill, West Norwood, S.E. Established 1902. [7402

EXTENDED PAYMENTS.

EXTENDED Payments.—All makes supplied, new and second-hand; lowest terms.—Service Co., 292, High Holborn, London. [7419

IGNITION APPLIANCES.

REMY Lighting Outfit, off Harley-Davidson, splendid condition; offers.—Ronaldson, Barhunnie, Glasgow. [X7418

180° (Douglas) Thomson-Bennett Magneto, new, £5/10; ditto, almost new, £4/5.—Service Co., 292, High Holborn, London. [7423

MAGNETO Repairs; immediate despatch, guaranteed workmanship, lowest charges. Send yours and let us quote you; no certificate required.—M. and S., 6, Melbourne Terrace, Devizes. [7474

TYRES.

THE Economic Tyre Co.—Special clearance lines; carriage paid; approval against remittance.

ECONOMIC.—26×2¼ Kempshall anti-skid, 17/6; selected covers, 21/-; 26×2⅜×2¼, 23/-; 26×2¼ Kempshall non-skid, 27/6; selected, 32/6, listed 53/4.

ECONOMIC.—24×2¼ de Luxe for 2-strokes, 30/-, listed 39/6; 26×2½×2¼ de Luxe, extra heavy, 35/-.

ECONOMIC.—26×2½ de Luxe, extra heavy, 35/-; Kempshall non-skid, 45/-, suit heavy machines.

ECONOMIC.—650×65 3-ribbed Clincher Dreadnought, 42/6, listed 55/-; 26×3 Kempshall heavy anti-skid, 51/3.

ECONOMIC.—28×3 Kempshall anti-skid, 35/-, listed 69/3; A Won passenger, 45/-; fluted, 35/-.

ECONOMIC.—26×2¼ tubes, 7/6; 26×2½×2¼, 7/6; 26×2½, 7/6; belts from 9d. foot.

ECONOMIC.—Cycle covers, various sizes, 20% to 50% off list, to clear; postage extra.

ECONOMIC Tyre Co., 137a, Lewisham High Rd., New Cross, S.E.14. 'Phone: New Cross 1393. [7532

TYRES.—See Bancroftian Advertisement under Miscellaneous. Stelastic, Pedley, Kempshall, Hutchinson; extraordinary prices. [0845

NEW Heavy Beaded Covers, 26×2 15/-, 26×2¼ 20/-, 26×2½ 22/6; butt-ended tubes, 26×2¼ 8/6, 26×2½ 9/-; endless tubes, 26×2¼ 7/6, 26×2½ 8/-; sent approval carriage paid receipt remittance.—Palmer's Garage, Tooting. [7092

ELITE Rubber Co., Ltd.—We have the following special clearance lines in motor cycle covers, belts, tubes, etc. These goods are quite new. Any article sent on 7 days' approval against remittance. A 3/- outfit sent free of charge to all purchasers of covers and tubes, as advertised, on orders exceedingly £1.

ELITE.—26×2 Clincher heavy De Luxe, 28/6, listed 38/-.

ELITE.—26×2¼ Stonehenge, 22/-, listed 32/6.

ELITE.—26×2½ Avon Stonehenge, 24/-, listed 35/3; Bates No. 1, special heavy, 39/-, listed 57/-.

ELITE.—650×65 Avon heavy 3-ribbed, 37/6, listed 53/-; Goodyear Diamond studded, fully guaranteed, 40/-, listed 68/-.

ELITE.—26×2¼ Bates No. 1, special heavy, 30/-, listed 50/6; Kempshall heavy anti-skid, 19/6, listed 37/6.

ELITE.—26×2⅜ (oversize for 2¼ rims) Bates, special heavy, 35/-, listed 53/6; Pedley extra heavy 3-ribbed, 28/6, listed 48/-.

ELITE.—28×3 Bates, special heavy, 50/-, listed 72/6; Dominion chain pattern, 45/-, listed 62/-.

ELITE.—700×80 (oversize for 650×65 rims) Goodyear diamond studded, 55/-, listed 79/- (fully guaranteed, specially recommended for Enfield and other heavy combinations).

ELITE.—26×2½×2¼ Midland heavy ribbed and studded; 25/-, listed 45/-.

ELITE.—24×2 Clincher de Luxe, 16/-; 24×2¼ Clincher heavy De Luxe, 32/6.

ELITE.—Best quality inner tubes, fully guaranteed: 26×2 6/-, 26×2¼ 7/-, 26×2⅜ 8/6, 26×2½ 8/6, 26×3 9/6, 28×3 10/-, 650×65 11/-; butted 1/6 extra.

ELITE.—Best quality belts (cannot advertise name), 6ft. lengths by 1in., 7/6 each; 6ft. 6in.×¾in., 6/9 each.

ELITE.—Pedley belts, any length, 1⅛in. 2/- foot, 1in. 1/9 foot, ⅞in. 1/5 foot, ¾in. 1/2 foot.

ELITE.—Retreading; extra heavy 17/6, heavy 15/-, medium 12/6; time required 7 days.

ELITE Rubber Co., Ltd., Head Office 321-3, High Rd., Streatham, S.W.16. 'Phone: Streatham 1467. Also at 266, Vauxhall Bridge Rd., Victoria, S.W.1 (one minute from Victoria Station). 'Phone: Victoria 6553. Please address all communications to Head Office, Streatham. [0933

TYRES by Best Makers; nearly half present prices.—Rubber studded, 26×2½, heavy, 31/6; 28×2½, heavy, 42/6; 28×3, heavy, 45/-; 26×2½ sidecar cover, 16/6; Kempshall heavy anti-skid, 26×2¼, 18/6 each; Continental heavy, 26×2½, 25/-; ditto sidecar tyres, 17/6; Goodrich 26×2¼in. rubber studded (clearance), 24/9 each.—Service Co., 292, High Holborn, London, W.C.1. [7415

BASTONE'S.—Special clearance lines: Michelin heavy Trident covers, B.E., 26×2¼, 19/6; ditto, wired, 26×2¼, 17/6; Michelin ordinary, B.E., 26×2, 9/6; ditto wired, 26×2½, 11/-; Pedley 3-ribbed, B.E., 26×2¼, 25/-; Henley rubber-studded, B.E., 26×2½, 17/6; tubes, 26×2 4/9, 26×2¼ 5/3, 26×2½ 5/9; all sizes covers and tubes in stock.—228, Pentonville Rd., King's Cross, London, N.1. Tel.: 2481 North. [7404

TANKS.

TANKS of every description; repairs, re-enamelling. Write for booklet.—Green, Walter St., Blackfriars, Manchester. [0900

TANKS.—Tanks any shape to order, repaired or enamelled; disc for motor wheels; general sheet metal work; lists free.—Attwoods, 86, Rosebery Av., E.C. Tel.: Central 12445. [5523

A SHIELD against Road-shocks

Just as his life "at the front" teems with proofs of the shielding merits of "Tommy's Tin Hat," justifying its wide adoption—so will peace-time motor cycle service demonstrate the superiority of that shield against road shocks—the famous

DRUID MARK II

Spring Fork—which will maintain, by total absorption within itself of all shocks, its inclusion on all good mounts.

A. DREW & Co., Ld.
Leopold St., BIRMINGHAM

R.H.S.

INSURANCE.

FOR Insurance of all kinds (specially motor), apply, Ernest J. Bass, Insurance Broker, Bishops Stortford. [0693

DREADNOUGHT Motor Cycle Policies at Lloyd's. Premiums from £1/7/6 per annum, payable monthly (fully insured on first payment). Before insuring elsewhere, write for prospectus issued solely by Roys, Ltd., 199, Piccadilly, London. Tels.: Regent 5878-9. [7734

PATENT AGENTS.

CONSULTING Patent Agency, 253, Gray's Inn Rd., London.—Free advice. Inclusive charges. [6333

INVENTORS' Advice and Handbook Free.—King's Patent Agency, Ltd., 186, Queen Victoria St., London. [5818

SITUATIONS VACANT.

WANTED, salesman-demonstrator (working), or man capable taking sole charge 40 cars; salary and commission; good opportunities, but must start reasonable; South London.—Write fully, Box L6,868, c/o *The Motor Cycle.* [7401

WANTED, junior mechanic, for cycle workshop; only those with previous experience in cycle workshop need apply. None already doing Government work or resident over ten miles away will be engaged.—Lamb, 151, High St., Walthamstow, E.17. [7651

THE British Ambulance Committee urgently require motor cyclists (paid and unpaid) for their sidecar convoy attached to the French army and now at work on the front in France. Full rations and travelling expenses provided free.—Apply, Transport Dept., 23a, Bruton St., W.1. [7641

RIDER TROWARD and Co., 31, High St., Hampstead, have vacancies at present for the following: Manager, must be used to office work; works manager, capable of controlling staff, preference to ex-N.C.O. (regular); two mechanics, one car, one motor cycle; two apprentices. Apply, with refereuces, at any time. No person resident more than 10 miles away, or already engaged on Government work, need apply. [7730

SITUATIONS WANTED.

DIRECTOR of old-established brass and copper works desires position with enterprising motor or aircraft works; over 27 years' practical experience, and expert in tube work, metal spinning, and lathe work, successful inventor; total abstainer, age 45, Grade 3.—Box 2,222, c/o *The Motor Cycle.* [X7363

TUITION.

MOTOR Tuition.—The British School of Motoring, Ltd., gives the highest standard of training in driving, mechanism, and repairs for the lowest fees in England. Call, or write for full particulars.—The British School of Motoring, 5, Coventry St., Piccadilly Circus, W. [0953

WANTED.

A.

SUNBEAMS, Harleys, A.J.S.'s, Enfields, B.S.A.'s, Nortons, Triumphs, Matchless, and Morgans; 1915's and later purchased for spot cash.—Maudes', 100, Gt. Portland St., London, W.1. [6311

F.N., 4-cyl., 5-6h.p., must be cheap.—17, Gilbert Rd., Eastbourne. [7644

PISTON, 62mm., for 2-stroke Hudson.—24, Shakespeare St., Hove. [X7380

WANTED, 70 mm. Scott piston and rings.—Diver, 4, Ridley Rd., Rochester. [7688

TRIUMPH Junior or Douglas; cheap.—De Villa, Brompton Rd., Northallerton. [X7346

DOUGLAS wanted, 2-speed, not earlier 1913; reasonable price.—98, Tulse Hill, S.W.2. [7514

DOUGLAS Crankshaft, 1911-12, new or second-hand.—Gregg, 41, Church St., Oswestry. [X7267

WANTED, Norton T.T. handle-bar.—Turner, 31, Daroley Av., Scotstoun, Glasgow. [X7265

100 Motor Cycles Wanted, spot cash paid; bring or send, Palmer's Garage, Tooting. [0917

WANTED, motor cycles, also push cycles, condition immaterial.—77, Acre Lane, S.W.2. [7697

WANTED, Sunbeam or Enfield Combination, for cash.—Brown, 1, Ebner St., Wandsworth. [7687

WANTED, Rex motor cycle sprocket and chain.—Soames, Rutland Lodge, Bromley, Kent. [7662

WANTED, spring seat for motor cycle carrier; on approval.—G. Harding, Holcombe, Bath. [X7403

2½h.p. F.N., 1914 preferred; send particulars.—Pemberton, Gablehurst, Hedge End, Hants. [7649

1914 2¾h.p. Humber, or good make 3½h.p.—Millward, B. Mobile Tyre Press, B.E.F., France. [X7406

RIDER TROWARD and Co., 31, High St., Hampstead, are cash buyers of any modern motor cycle. [7728

WANTED, B.S.A., P. and M., or other good combination.—Particulars to Taylors, Crosshill, Brifield. [X7200

WANTED, old motor cycle, Singer motor wheel considered, if cheapest offered.—Huggins, Skelton, York. [X7364

GOOD Combination, also lightweight; must be cheap for cash.—47, Blackhorse Lane, Addiscombe, Croydon. [7710

WANTED, a first-class combination, or good solo, for spot cash.—36, De Laune St., Kennington, S.E.11. [7671

WANTED, countershaft combination, for concert gramophone, cycle.—15, Holden Park Rd., Southborough. [7712

TRIUMPH, 3½h.p., wanted, F.E., kick starter, sidecar, late model.—Atherton, 147, Denmark Rd., Camberwell, S.E. [7718

WANTED, motor cycle or combination; send particulars, price, time viewed.—Box L6,958, c/o *The Motor Cycle.* [7724

WANTED, sidecar suitable for Harley-Davidson, good condition; good price given.—Box L6,956, c/o *The Motor Cycle.* [7726

WANTED, Model 3 7-8h.p. Bat frame, for J.A.P. engine; centre only will do.—"Gorphwysfa," Holyhead Rd., Bangor. [X7402

WANTED, high tension terminal, bush, wire, for non-waterproof Bosch, DA2 type.—Whiteside, Castle Garth, Kendal. [X7416

WANTED, good up-to-date second-hand accessories; state particulars and prices.—Service Co., 292, High Holborn, London. [7417

LATE Model Douglas or Baby Triumph, spot cash, ready for immediate use.—40, Carlton Mansions, Maida Vale, London, W. [7742

AUTO-WHEEL wanted, 1914 or later, condition optional.—Quote number, price, condition, to Box 2,196, c/o *The Motor Cycle.* [X7188

MOTOR Cycle or combination, must be in good condition, for spot cash; no dealers.—Orton, Beechwood, Hale Lane, Mill Hill. [7639

WANTED, main driving pinion and layshaft double pinion for 1914 Indian 2-speed gear box.—Box L6,934, c/o *The Motor Cycle.* [7638

WANTED, 20 second-hand Baby Triumph 2-stroke motor cycles, must be in good condition.—Box L6,777, c/o *The Motor Cycle.* [7233

WANTED, 40×⅝×¼in., 20×⅝×¼in., 16×⅝×¼in. Chater-Lea chain sprockets; 2½h.p. Premier cylinder.—Lovatt, 9a, Brightwell Crescent, Tooting. [7704

WANTED, Indian 7-9h.p. combination, late model, overhead inlets, spring frame, 3 speeds; reasonable price.—Particulars, J.B., 18, Southend Rd., Basingstoke. [7652

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AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Telephone: 2848 City (five lines).

Editorial Offices:
Hertford Street, Coventry.
Telegrams: "Motocycle Coventry."
Telephone: 10 Coventry (five lines).

Northern Offices:
199, Deansgate, Manchester.
Telegrams: "Iliffe, Manchester."
Telephone: 620 City.

Subscription Rates: Home, 15s. 2d.; all countries abroad, 19s. 6d. per annum.
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AUSTRALIA—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin. INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Weatherproofing.

IN our issue for August 22nd "Rif-raf" asked some pertinent questions concerning post-war machines. The theme running through his letter—a letter that embodies questions thousands of motor cyclists are asking to-day—is the discomfort of the drivers of sidecars. "Rif-raf" says, "I should have somewhere about £150 to spend on something in the motor vehicle way, but what shall it be? I do not desire great speed, but I do desire to keep myself clean and be able to go out on a run when the weather is in an uncertain mood without looking like a skipper of a racing motor boat."

Spring frames are receiving tremendous attention from manufacturers, but real endeavours to meet the complete desire of such men as "Rif-raf" (and there are many such motor cyclists) are not plentiful.

When an effort has been made to produce a mud and weatherproof passenger machine the result has been the evolution of a new type of vehicle, and not an improved sidecar outfit. The Scott Sociable is a recent example, and in many other attempts to solve the problem a distinct departure in design has been the result. Possibly the double-seated sidecar to accommodate the driver and passenger is the nearest and simplest solution of the almost insurmountable difficulty of protecting the driver.

There is an increasing desire on the part of motor cyclists, especially sidecarists, to motor in a garb less ugly and conspicuous than the usual overall leggings and waterproof jacket. On the face of it, it would seem that the driver of a motor cycle will always have to bear the stigma of "dirty" after ploughing for any length of time along muddy roads.

Spring frames lend comfort to the driver, and it is pleasurable to note that our spring frame campaign is bearing fruit, but it is time attention was turned to another aspect of driving comfort. Surely some means can be evolved whereby the sidecar driver may be able to remain far cleaner than has been possible up to the present? Obviously it is a difficult problem, and until it is solved a certain class of sidecarist—like "Rif-raf"—will turn longingly to the simple three-wheeler or cycle car.

The Steam Cycle.

THE present conditions of fuel restrictions, and the possibilities of post-bellum difficulties in that direction, are impelling the attention of engineers toward the decidedly attractive proposition of the steam bicycle. Like many other engineering prospects, it has benefited by the war-time-gained-and-developed experience of the designers—experience born of a newly created enthusiasm to tackle the ever-increasing problems of locomotion and a more definite understanding, brought about by the times, of what those problems are. The majority of designs that we have seen retain the standard motor cycle frame, tank, and controls, so that, as regards driving, it should come as second nature to the average motor cyclist. The main problem to be solved is the design of the boiler. We do not think the coke-fired type will find much favour among motor cyclists, as, apart from the question of fuel transport, there is a certain crudity about coke that most of them would regard as an extremely retrograde step. Probably the most promising type would be that employing a light oil fuel flash boiler.

The majority of designers fortunately seem to have a *penchant* for poppet valves (principally of the overhead type), and in the steam cycle, of course, valve breakages are rare, and there is no fear of burning them. Strange to say, one of the smallest parts is the cylinder. On the whole, we do not consider that any objection can be raised as regards the possibility of building a sporting looking mount. Torque, gearing, and silencing problems are largely overcome. This in itself is quite enough to make the proposition an interesting one.

An index to the advertisements in this issue will be found on the page facing the back cover.

TYRES.

THE Economic Tyre Co.—Special clearance lines; carriage paid; approval against remittance.

ECONOMIC.—26×2¼ Kempshall anti-skid, 17/6; selected covers, 21/-; 26×2⅜×2¼, 23/-; 26×2¼ Kempshall non-skid, 27/6; selected, 32/6, listed 53/4.

ECONOMIC.—24×2¼ de Luxe for 2-strokes, 30/-, listed 39/6; 26×2½×2¼ de Luxe, extra heavy, 35/-.

ECONOMIC.—26×2½ de Luxe, extra heavy, 35/-; Kempshall non-skid, 45/-, suit heavy machines.

ECONOMIC.—650×65 3-ribbed Clincher Dreadnought, 42/6, listed 55/-; 26×3 Kempshall heavy anti-skid, 51/3.

ECONOMIC.—28×3 Kempshall anti-skid, 35/-, listed 69/3; A Won passenger, 45/-; fluted, 35/-.

ECONOMIC.—26×2¼ tubes, 7/6; 26×2½×2¼, 7/6; 26×2½, 7/6; belts from 9d. foot.

ECONOMIC.—Cycle covers, various sizes, 20% to 50% off list, to clear; postage extra.

ECONOMIC Tyre Co., 137a, Lewisham High Rd., New Cross, S.E.14. 'Phone: New Cross 1393. [7532

TYRES.—See Bancroftian Advertisement under Miscellaneous. Stelastic, Pedley, Kempshall, Hutchinson; extraordinary prices. [0845

NEW Heavy Beaded Covers, 26×2 15/-, 26×2¼ 20/-, 26×2½ 22/6; butt-ended tubes, 26×2¼ 8/6, 26×2½ 9/-; endless tubes, 26×2¼ 7/6, 26×2½ 8/-; sent approval carriage paid receipt remittance.—Palmer's Garage, Tooting. [7092

ELITE Rubber Co., Ltd.—We have the following special clearance lines in motor cycle covers, belts, tubes, etc. These goods are quite new. Any article sent on 7 days' approval against remittance. A 3/- outfit sent free of charge to all purchasers of covers and tubes, as advertised, on orders exceedingly £1.

ELITE.—26×2 Clincher heavy De Luxe, 28/6, listed 38/-.

ELITE.—26×2¼ Stonehenge, 22/-, listed 32/6.

ELITE.—26×2½ Avon Stonehenge, 24/-, listed 35/3; Bates No. 1, special heavy, 39/-, listed 57/-.

ELITE.—650×65 Avon heavy 3-ribbed, 37/6, listed 53/-; Goodyear Diamond studded, fully guaranteed, 40/-, listed 68/-.

ELITE.—26×2¼ Bates No. 1, special heavy, 30/-, listed 50/6; Kempshall heavy anti-skid, 19/6, listed 37/6.

ELITE.—26×2⅜ (oversize for 2¼ rims) Bates, special heavy, 35/-, listed 53/6; Pedley extra heavy 3-ribbed, 28/6, listed 48/-.

ELITE.—28×3 Bates, special heavy, 50/-, listed 72/6; Dominion chain pattern, 45/-, listed 62/-.

ELITE.—700×80 (oversize for 650×65 rims) Goodyear diamond studded, 55/-, listed 79/- (fully guaranteed, specially recommended for Enfield and other heavy combinations).

ELITE.—26×2½×2¼ Midland heavy ribbed and studded; 25/-, listed 45/-.

ELITE.—24×2 Clincher de Luxe, 16/-; 24×2¼ Clincher heavy De Luxe, 32/6.

ELITE.—Best quality inner tubes, fully guaranteed: 26×2 6/-, 26×2¼ 7/-, 26×2⅜ 8/6, 26×2½ 8/6, 26×3 9/6, 28×3 10/-, 650×65 11/-; butted 1/6 extra.

ELITE.—Best quality belts (cannot advertise name), 6ft. lengths by 1in., 7/6 each; 6ft. 6in.×¾in., 6/9 each.

ELITE.—Pedley belts, any length, 1¼in. 2/- foot, 1in. 1/9 foot, ⅞in. 1/5 foot, ¾in. 1/2 foot.

ELITE.—Retreading; extra heavy 17/6, heavy 15/-, medium 12/6; time required 7 days.

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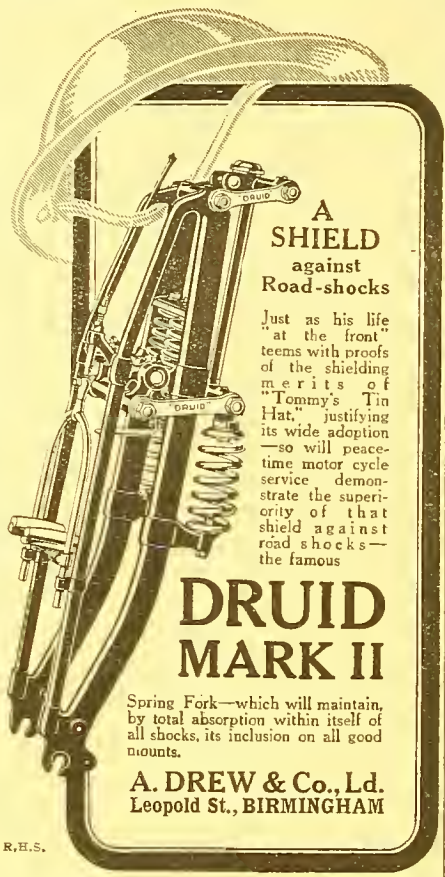

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Weatherproofing.

IN our issue for August 22nd "Rif-raf" asked some pertinent questions concerning post-war machines. The theme running through his letter—a letter that embodies questions thousands of motor cyclists are asking to-day—is the discomfort of the drivers of sidecars. "Rif-raf" says, "I should have somewhere about £150 to spend on something in the motor vehicle way, but what shall it be? I do not desire great speed, but I do desire to keep myself clean and be able to go out on a run when the weather is in an uncertain mood without looking like a skipper of a racing motor boat."

Spring frames are receiving tremendous attention from manufacturers, but real endeavours to meet the complete desire of such men as "Rif-raf" (and there are many such motor cyclists) are not plentiful.

When an effort has been made to produce a mud and weatherproof passenger machine the result has been the evolution of a new type of vehicle, and not an improved sidecar outfit. The Scott Sociable is a recent example, and in many other attempts to solve the problem a distinct departure in design has been the result. Possibly the double-seated sidecar to accommodate the driver and passenger is the nearest and simplest solution of the almost insurmountable difficulty of protecting the driver.

There is an increasing desire on the part of motor cyclists, especially sidecarists, to motor in a garb less ugly and conspicuous than the usual overall leggings and waterproof jacket. On the face of it, it would seem that the driver of a motor cycle will always have to bear the stigma of "dirty" after ploughing for any length of time along muddy roads.

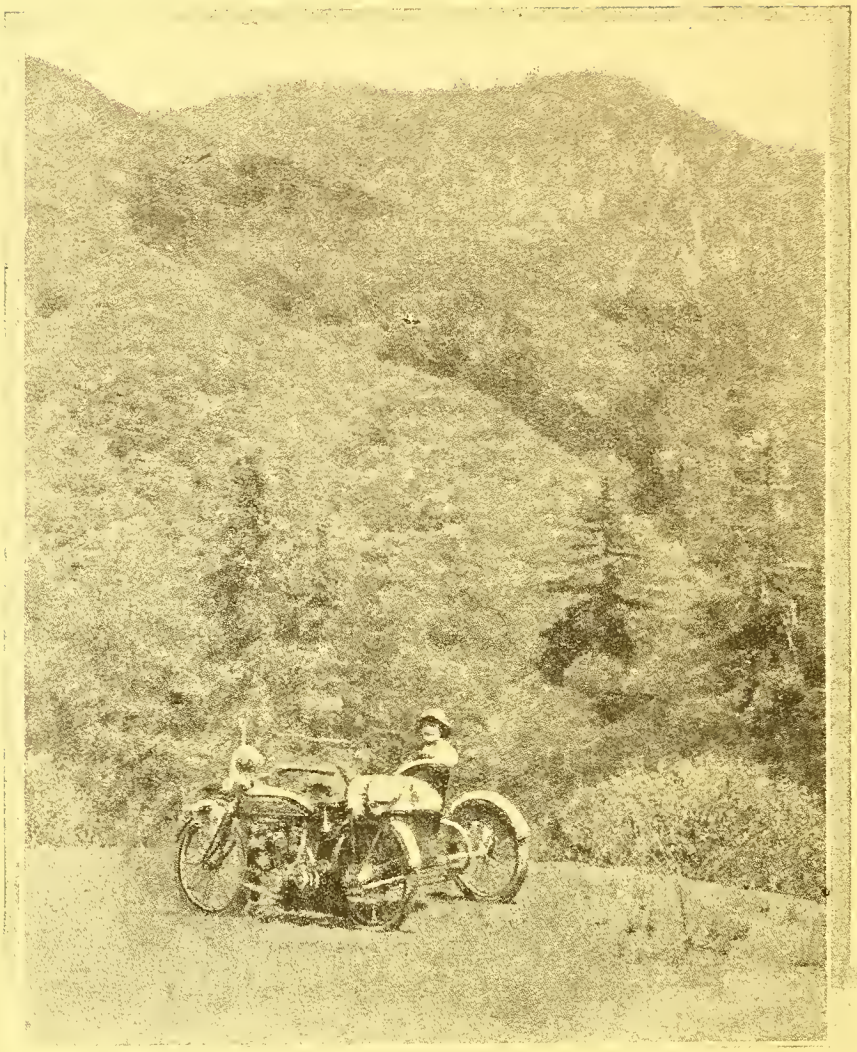
Spring frames lend comfort to the driver, and it is pleasurable to note that our spring frame campaign is bearing fruit, but it is time attention was turned to another aspect of driving comfort. Surely some means can be evolved whereby the sidecar driver may be able to remain far cleaner than has been possible up to the present? Obviously it is a difficult problem, and until it is solved a certain class of sidecarist—like "Rif-raf"—will turn longingly to the simple three-wheeler or cycle car.

The Steam Cycle.

THE present conditions of fuel restrictions, and the possibilities of post-bellum difficulties in that direction, are impelling the attention of engineers toward the decidedly attractive proposition of the steam bicycle. Like many other engineering prospects, it has benefited by the war-time-gained-and-developed experience of the designers—experience born of a newly created enthusiasm to tackle the ever-increasing problems of locomotion and a more definite understanding, brought about by the times, of what those problems are. The majority of designs that we have seen retain the standard motor cycle frame, tank, and controls, so that, as regards driving, it should come as second nature to the average motor cyclist. The main problem to be solved is the design of the boiler. We do not think the coke-fired type will find much favour among motor cyclists, as, apart from the question of fuel transport, there is a certain crudity about coke that most of them would regard as an extremely retrograde step. Probably the most promising type would be that employing a light oil fuel flash boiler.

The majority of designers fortunately seem to have a *penchant* for poppet valves (principally of the overhead type), and in the steam cycle, of course, valve breakages are rare, and there is no fear of burning them. Strange to say, one of the smallest parts is the cylinder. On the whole, we do not consider that any objection can be raised as regards the possibility of building a sporting looking mount. Torque, gearing, and silencing problems are largely overcome. This in itself is quite enough to make the proposition an interesting one.

An index to the advertisements in this issue will be found on the page facing the back cover.

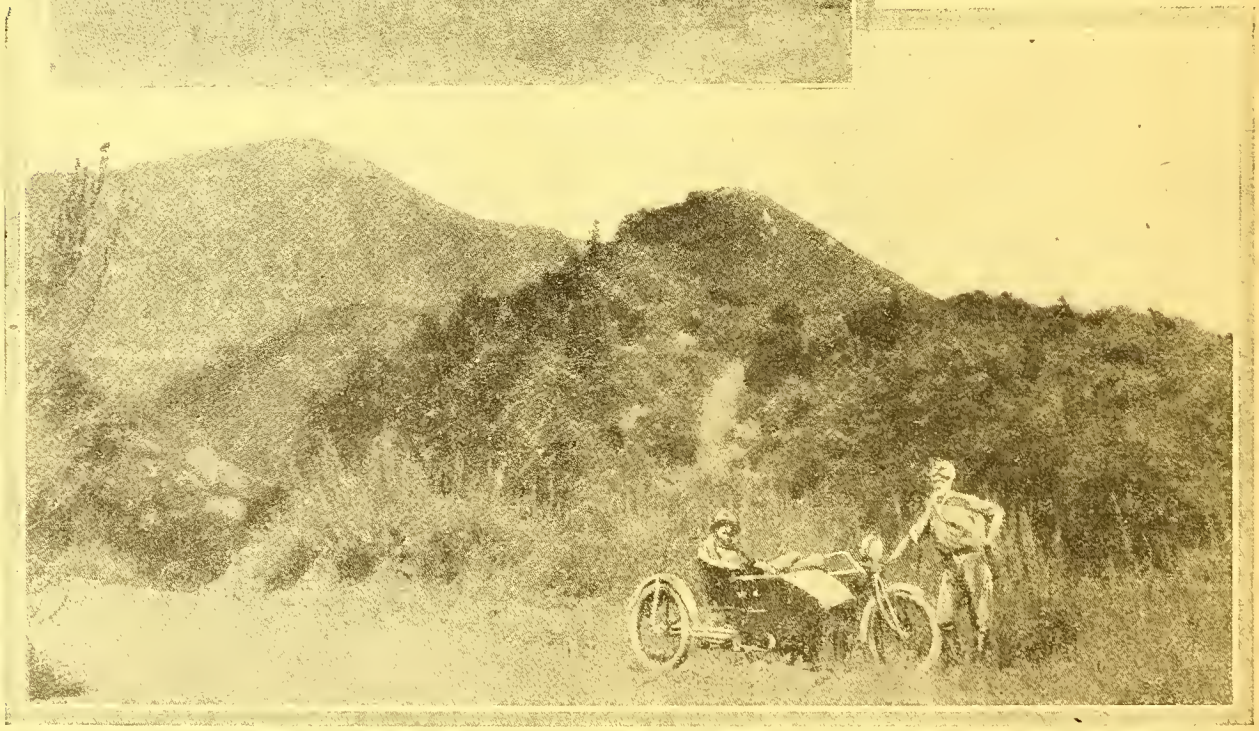


In the Country of the Canyons.

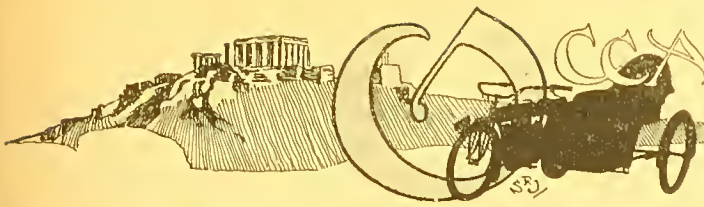
An Economical Wartime Holiday.

EVEN in these strenuous days occasional American sidecar enthusiasts find time to wander through the more remote byways of their country, among the majestic mountain ranges, through virgin pine forests, past mountain lakes, and countless vistas that rival the Alps with their beauty and grandeur.

These pictures are from a tour in California, one of the most beautiful parts of Western America. The trip was made in a sidecar outfit which carried the entire impedimenta, including a tent, cooking utensils, and provisions for two weeks. Almost a thousand miles were covered, trout fishing and hunting indulged in, and the cost worked out at a mere 30s. each per week.



Scenery in the Mill Creek Canyon, California. In this district the roads are well graded, and have fairly good surfaces. It can well be imagined that this area forms a magnificent touring ground for Californian motorists.



OCCASIONAL COMMENTS

BY 'IXION'

Cooling the Induction Pipe.

"BALKAN TAP'S" letter in our issue of August 8th is one of the most interesting we have printed for months past. His thesis is that (*a*) under given conditions the induction system becomes so hot that the gas expands enormously, and the engine is unable to draw in anything like a full charge during the brief period for which the inlet valve is open. (*b*) The given conditions imply continuous miles of low gear work.

It is obvious that few, if any, stay-at-home motorists have encountered such conditions. In the old days of 1904, etc., our engines used to get red hot all over, and we possibly suffered from induction charges becoming attenuated by heat, though the colossal distortion of our cylinders and pistons distracted our attention from the fact. Conceivably in some of the freak precipice crawls for which the A.C.U. and other bodies developed a *penchant* just before the war, a few single-cylinder machines with stub induction pipes suffered in the same way: but I frankly question whether any flat twin has ever overheated its induction system on English roads; my own usually remains ice-cold after two miles of full throttle work on a 9½ gear. While I admit "Balkan Tap" is plausible enough, I must say I should like further evidence on this point.

The Corollary.

I SUPPOSE readers will tumble to the fact that if "Balkan Tap" is right, his contention should affect design, at any rate so far as Overseas machines are concerned. It is admitted that post-war petrol will be very sluggish stuff, and in America, the one country where the design of "pleasure" motors survives, special methods are being tested for vaporising heavy fuel in cold engines, in order to facilitate the start-up, and the get-away, and to use up the heavier ingredients. These all include heat in one form or another, and we may classify the devices according as the necessary heat is derived from the exhaust or from some electrical fitting. In the former class a thin partition separates the induction pipe from the exhaust pipe: in such designs the induction pipe is *permanently* heated, and the hotter the engine gets the hotter the induction system becomes. In the latter you switch your auxiliary heat on or off, according to circumstances. For ordinary use on English roads exhaust heating is unquestionably efficient, and has the merit of cheapness and simplicity. But if "Balkan Tap" is not talking through his hat, electrical carburetter heating may prove indispensable on post-war machines built for the Overseas markets. There, as here, heat will be essential for the start-up and the get-away: the difference lies in the fact that no machine does twelve miles hard throttle work on a low gear in England, but in the Colonies normal conditions often approximate to those with which the war has familiarised the D.R.'s. Personally, I shall watch American post-war practice rather closely on this point; many American riders get through a lot of low gear sand-plugging in a year's work.

The Aftermath.

THIS very afternoon as ever was I heard some of the ripest feminine swears ever heard out of range of a canal bank from a girl motor cyclist whose machine was stalling at the take-off with a sooted plug or some other internal ailment. The puir wee lassie was trying to push-start between 3 cwt. and 4 cwt. This explains why motor cycling is still a young man's game. The aeroplane, in due course, will father the 50 lb. baby two-stroke; and all the slim flappers and decrepit old Methuselahs will be habitual motor cyclists. May I live to see it.

Hoch! The Big Yanks.

I AM still rubbing my eyes after reading Mr. Walmsley's panegyric of the big Yankee twins. Does he represent the mind of the average Overseas rider? Here is his list of the big Yank's attractions: "Spring frame, big ground clearance, 28 × 3in. tyres, mechanical oiling, twist grip control, hand and foot-controlled clutch interlocked with gear shift, etc., etc." I give him the big ground clearance, which I admit is desirable Overseas. Some British machines have better rear springing than any foreign make, and *most* British machines have better forks than any foreigner, the forks of which usually wear extremely fast. Three inch tyres I thoroughly dislike for solo work: if you blow them up hard, you lose all possible benefit: if you ride them slack, they "roll"; and a motor cycle should not go too far in attempting aeroplane stunts. Mechanical oiling is ideal in theory; in practice I have usually found it comparable with the sight-drip-feed, viz., it is seldom safe to take its action for granted, and the provided adjustments have astoundingly little effect. Dual control of the clutch is a concession to clumsy drivers, and is usually adopted by makers because (*a*) they have failed to devise an easy hand control with good leverage, and (*b*) there are circumstances under which no man dare take a hand off the bar. But there is at least one perfect hand clutch control: it happens to be British, and I cannot conceive of any sane man who has used it asking for an auxiliary control as well. The interlocking of clutch and gear controls is another concession to dud drivers; I knew we had plenty of them at home, but I had allowed the novelists to persuade me that Colonials are clean-limbed, blue-eyed, and efficient. When I ride an American I steel myself to tolerate the abominable features Mr. Walmsley prizes, and I like the machine because its grotesque weight sits the road so steadily, and its ridiculously large engine takes ordinary speeds so easily, and gobbles up the road so gorgeously when I want to open it out.

THE DESIGN OF SINGLE-LEVER CARBURETTERS.

Notes on the Advantages and Disadvantages of the Automatic Type.

THE study of carburetters is a subject on which much time has been spent, and, although on the whole most of the instruments at present on the market perform their duties in a very satisfactory manner, they are still far from perfect. The motors which start up at once are greatly in the minority, and as a rule it is the carburetter which is at fault. Most motor cyclists take the starting up of their machines in a somewhat philosophical spirit; that is, they flood the carburetter and give the kick-starter a dig, and, as often as not, an injection of petrol into the cylinders and a few more digs are required before a start is effected. Yet they consider their machines easy starters, forgetting that the drawing of a quantity of explosive gas, of the right density, etc., should be a certainty and not a twenty to one chance, as with the usual two-lever carburetter.

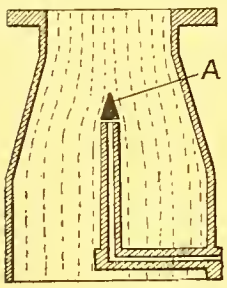


Fig. 1.—Showing the vertical jet and air currents.

Amongst motor cyclists, the automatic or one-lever carburetter has not made much headway, and this is due to the idea that with the usual controlled air slide better results can be had, on account of the ever-changing air and road conditions. This is a very extreme view, for if the consumption of petrol is taken on the ton-miles basis the usual automatic carburetter on a car makes a much better showing than the most economical motor cycle with a two-lever carburetter. However, this is not a fair basis from which to argue, as windage, etc., cannot be correctly calculated; but there is no doubt that, whatever the gain in mileage, the motor cyclist loses a lot in "controllability," especially if he has a liking for a hand-controlled clutch. The average solo machine, when free, simply races on the smallest throttle opening, and the noise is out of all reason. The pilot jet is in the right direction, but it is usually of microscopic size and chokes too easily.

Position of Jet.

A point often overlooked in the design of carburetters is the position of the jet in relation to the direction of the air current, the general impression being that it is the decrease of atmospheric pressure in the choke tube which causes the petrol to flow from the jet. Assuming that on the induction stroke of the piston there is a vacuum of eight inches in the cylinder, this negative pressure will gradually decrease in the induction pipe until at the mouth of the carburetter it will just be atmospheric. In the region of the jet it may be about four inches, and in some carburetters it is just this amount of negative pressure which sucks the petrol out of the jet, while in others it is only partially the case and another factor enters. Fig. 1 shows a vertical jet in an eularged form, the dotted lines representing the air currents as they pass round the jet. Now in this design of jet it would not matter if, instead of a negative pressure in the choke tube, there was air with 100 lb. pressure behind it. Petrol would still flow from the jet, as the air, in rushing past the jet, forms a vacuum in the shape of a cone (marked A), and into this cone-shaped vacuum petrol would rush from the jet. This second factor can be eliminated in different ways, one by having the jet placed at right angles to the air flow or even at 45%. Fig. 2 shows the first way, which is like the Amac, while the S.U. carburetter is an example of the second, or 45% type.

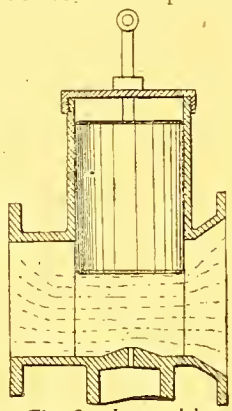


Fig. 2.—Jet at right angles to the air flow.

A German Type.

Now there are various ways in which a fairly constant quality of mixture can be obtained, and although they all work satisfactorily in multi-cylindered engines, yet they have not been a great success on the motor cycle engines, the reason being that they require a constant suction to keep down the inertia of their moving parts. Fig. 3 is the latest Mercédès design, in a simple sketch and minus its pilot jet. This belonged to the engine of one of the Gotha raiders recently brought down in England, and as it is one of the weighted valve type it is worth while illustrating. The design is very simple and even elementary, and it would seem that the progress made during the last ten years has been small indeed if such a simple design is found to be the best the Germans have for their latest aeroplanes.

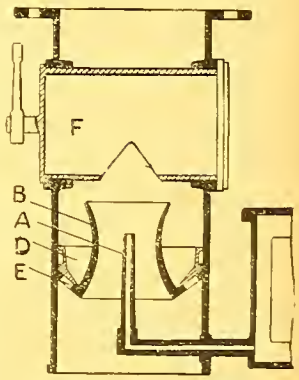


Fig. 3.—The Mercédès, the carburetter used by the Gotha raiders.

The Design of Single-lever Carburetters.—

Referring to the drawing, the single jet A is surrounded by the choke B. At the bottom of B are extra air passages E, and over these passages is placed a piston air valve D. When the speed of the engine increases the valve D is lifted off the seating and allows extra air to pass through the passages E and around the outside of the choke tube B. A circular throttle F controls the amount of mixture to be passed to the engine, and the throttle controls both the air passed through B and also through the air passages E. A great number of highly successful carburetters are built on this principle of the weighted or spring-controlled extra air passage, and although they work all right on a four or six-cylindered engine, on a single or twin, with its intermittent periods of suction, they are a failure, for the inertia of the air valve is too great, and it upsets the mixture.

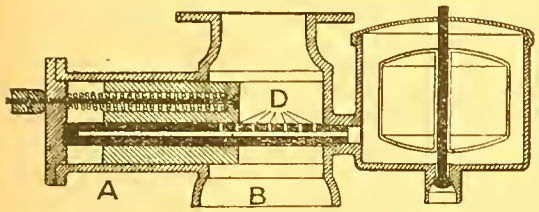


Fig. 4.—The Everest, with horizontal jets.

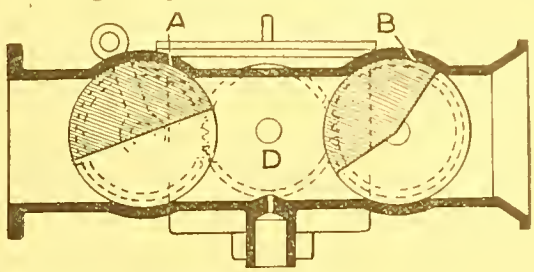
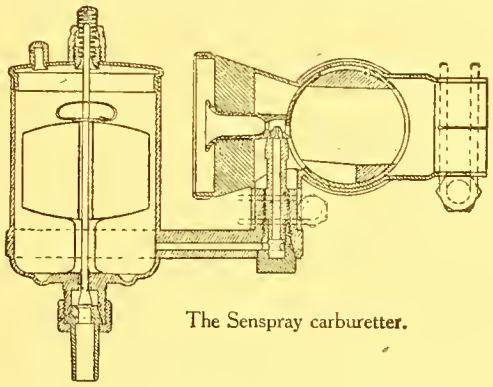


Fig. 5.—A carburetter with duplex throttle arrangement.

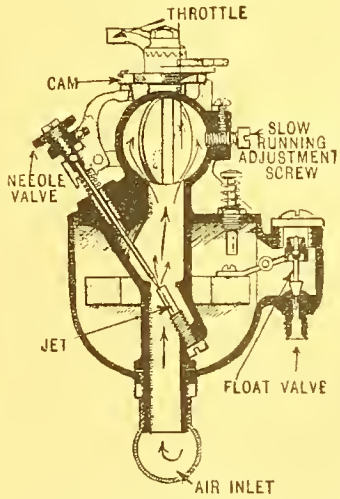

The Senspray carburetter.

The Everest Type.

The second type of carburetter seems much more likely to meet our requirements, and the Everest is a good example of this class. The fundamental idea here is to make the engine follow the movements of the throttle, and at the same time to proportion the air to the petrol on a definite basis, and thus always have the mixture at the right strength. I believe the Everest is made with vertical jets now, but for the sake of simplicity I have shown it in fig. 4 with horizontal jets. The throttle A encloses the jet tube B and slides from right to left. In doing so it uncovers the jets D one by one. It will be seen that the amount of throttle opening to jet opening can be regulated to a nicety, and yet there are no uncontrolled rapidly moving parts in the construction, and so it is very suitable for motor cycle engines. Some adjustment would require to be added to tune up, etc., but altogether the design is about the most promising of the newer types.

I often think that not enough is made of controlling the pressure in the choke tube or mixing chamber of the carburetter. All the throttling, etc., is done after the air has passed the jet, and it must be quite apparent that the air in passing the jets, etc., is always changing in density and in volume, and, as the rapidity at which the air is travelling is one of the factors to be taken into consideration, if we can control the other factor, *i.e.*, the negative pressure round the jet, we should be near the solution of our difficulties. At slow engine speeds, when you have not the rush of air sufficient to suck up enough petrol to give you a rich mixture, it would be easily obtained if you could increase the negative pressure in your choke or mixing chamber, for the greater vacuum would draw more petrol out of the jet.

This can be accomplished by having a duplex throttle arrangement, such as in fig. 5, and having the first one A set in advance of B, so that A closes 20% earlier than B. If you will refer to the drawing, you will see that the main throttle B is half open, while A, which controls the vacuum in the mixing chamber D, is only one-quarter open, so that with this setting a much richer mixture than usual will be obtained. Supposing one was starting up, A would be practically closed, so that the vacuum in mixing chamber D would be very high; consequently a good flow of petrol would come out of the jet, and thus a rich mixture would be obtained. At the larger throttle openings, the first throttle A would gradually give as much opening as B, and thus automatically go out of action, coming in again at the lower speeds and poorer suction and then giving a proportionately richer mixture. The two throttles A and B can easily be geared together by tooth wheels, and by slipping forward or backward a tooth very fine adjustments can be had.

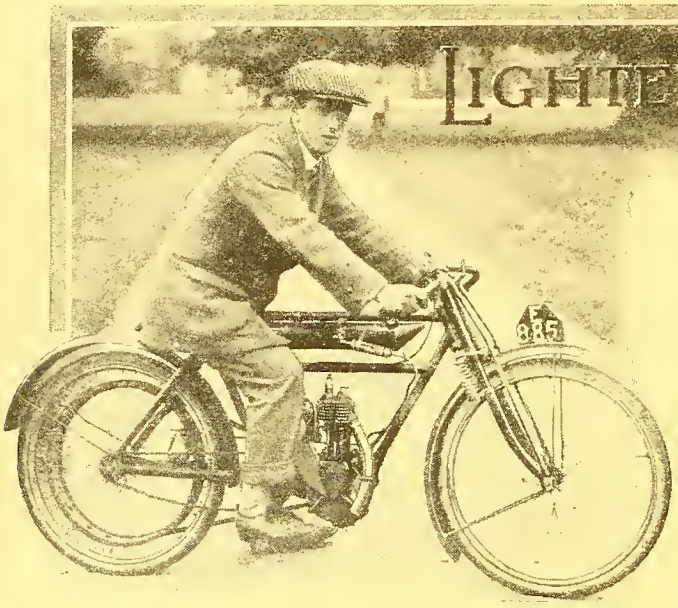


The American Schebler automatic carburetter.

It seems to me to have the qualifications of a good one-lever motor cycle carburetter, though some carburetters, by varying the size of the choke tube, control the air in somewhat the same manner, but they do so on the jet level, which is too late to be of much use.

In conclusion, the designing of a perfect one-lever carburetter for a motor cycle may be impossible, but the making of one capable of doing the work of the present two-lever designs, and doing it better, should not prove such a task as it was once believed to be. JAMES MARTIN.

LIGHTER LIGHTWEIGHTS



A Plea for a Small Lightweight Motor Cycle as a Step between the Motorised Bicycle and the Motor Cycle Proper.

BETWEEN the bicycle fitted with an auxiliary engine and the machine designed as a motor cycle there is room for a compromise embodying features of each type. The former at the best is little more than a makeshift—an adaptation; what is required is a motorised bicycle specially designed as such.

There are, or were, quite a number of small lightweight motor cycles on the market, and their success removes the doubt that existed at one time concerning the durability of very small engines. But their makers for some reason enlarged them, developed them, and increased their price until they no longer represent the pony of the motor cycle stable, and they have grown to be "cobs."

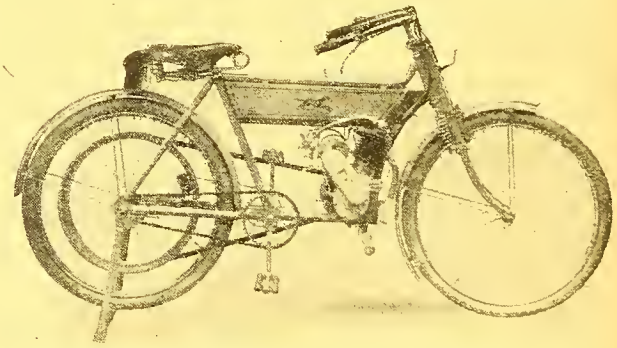
Reversion to "L.P.A."

Undoubtedly there is a big demand for the sturdy "cob" type of machine, but there is also much promise in a model smaller, not so elaborate, lighter, and—the most important item—cheaper.

A lightweight embodying a two-speed countershaft gear, and sometimes a clutch, is comparatively costly, and the introduction of the gear box means the elimination of the pedalling gear. This necessitates an engine sufficiently powerful to do all the work: to climb every hill. To provide this the cylinder size is increased, the tyres are larger, and the price gradually increases until the proposition enters a market totally different from that for which it was designed in the first place. The lighter lightweight, therefore, should have pedalling gear and either a single gear or a simple form of epicyclic two-speed gear in the engine pulley. With "l.p.a." to fall back upon on the very steep hills which the rider would perhaps come across once or twice in a season's riding, the engine could be kept quite small.

The mention of "l.p.a." reminds the writer that one very rarely hears this abbreviation mentioned now, hence, perhaps, it is necessary to explain to the younger class of motor cyclist that it means "light pedal assistance." Incidentally, the pedal assistance necessary in some of the early trials sometimes was far from light, but with a machine weighing approximately 100 lb. and suitably geared for both engine and pedalling gear, the little pedalling assistance which would be required would be very light indeed.

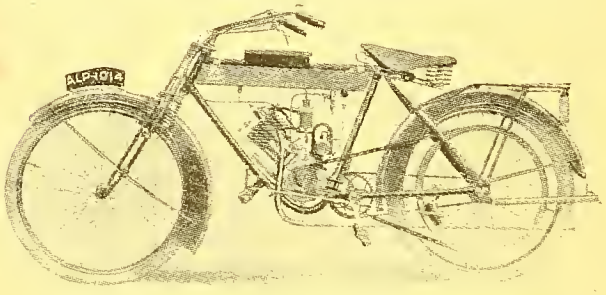
The motorised bicycle undoubtedly will be the means of introducing thousands of cyclists to motoring, but it has its limitations which the lighter lightweight would considerably extend. An ordinary bicycle fitted with an auxiliary motor is under-tyred, overloaded, and over-geared at the pedalling gear.



An early Wolf lightweight with four-stroke engine, having an outside flywheel. This machine was designed to sell at about £20.

Slightly larger tyres than 28 × 1½in. are necessary. In the lighter lightweight they would be 26 × 2in. The motorised bicycle has not a spring fork, which is necessary in a motor-propelled cycle. Slightly heavier gauge tubing, too, should be used—in fact, the cycle part of the machine really should be specially made. Then why not go just one step further—at very little extra cost—and design it as a motorised bicycle? A small motor cycle designed to carry an engine and its fuel tank, with adequate brakes, footrests, and saddle.

There have been several such machines on the market, but most of them had four-stroke engines, and



The 2 h.p. Alp motocyclet, with 257 c.c. Moto-Reve engine. Weight 106 lb.

Lighter Lightweights.—

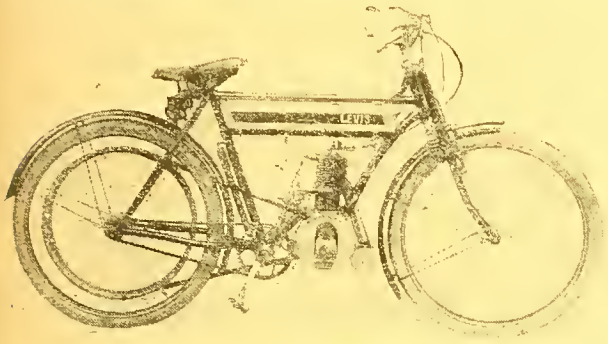
however small a four-stroke engine is made it contains practically the same number of parts as its larger sister, and, therefore, is a somewhat expensive piece of machinery to produce. Besides this, the valve gear parts are so small that a long life cannot reasonably be expected.

Possibilities of the Two-stroke.

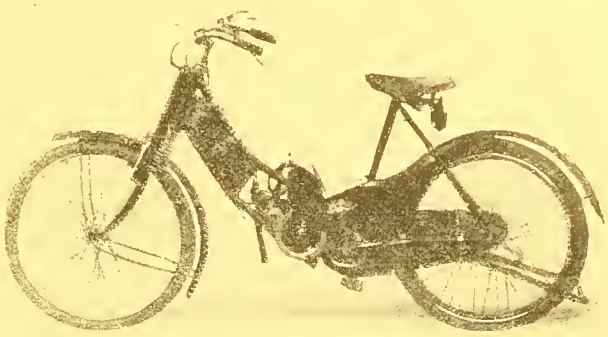
The two-stroke offers greater possibilities. A small single-cylinder two-stroke will develop more power than a four-stroke of the same capacity. It can be made lighter, and, owing to its simplicity, very much more cheaply. Probably the Levisette comes nearest to the type of machine I have in mind. This little machine, which was designed throughout with the idea of being produced and sold at a popular price, had a 58 × 66 mm. engine, with single main crankshaft and crank, and drove the magneto by a direct coupling. A flat twin two-stroke, however, is not altogether out of the running for such a machine, and an engine such as is now marketed in the United States as an auxiliary attachment, which was illustrated and described in *The Motor Cycle* for August 15th, could be made as cheaply as a single-cylinder four-stroke.

Such a machine as outlined would not be a "motor cyclist's" mount, but rather would it be a petrol-driven bicycle, and as such would be found of great service to the many thousands who use a pedal cycle in preference to running, perhaps, a sidecar machine for hack purposes between home and office.

VEDETTE.



The Levisette of 1913 mentioned by our contributor.



The lady's model Pacer with J.E.S. engine. A machine designed as a motorised bicycle.

Four-cylinder Engine Dimensions.

The Question of Long and Short Stroke.

THE announcement that several firms are experimenting with four-cylinder engines has brought forth several enquiries from readers respecting the proposed bore-stroke ratios under consideration. From this it may be gathered that the short *v.* long stroke controversy is likely to be with us for some years to come. It is interesting, however, to review the respective bores and strokes of four-cylinder engines that have been produced recently and to consider the various sizes in which it is possible to make a four-cylinder engine of 1,000 c.c. and under.

The 4-5 h.p. F.N. has cylinders 52½ × 57 mm. = 495 c.c., the larger F.N., 52 × 88 mm. = 748 c.c. The T.M.C. 8 h.p. model had cylinders 60 × 75 mm. = 848 c.c., while a larger size with cylinders 62 × 90 mm. = 1,087 c.c., was also made. The Henderson's cylinders are 64 × 76 mm. = 978 c.c. At one time the most popular size of four-cylinder engine used in small light cars was 50 × 100 mm. = 1,098 c.c.

If four-cylinder engines are to be made much below 1,000 c.c. it would appear that the long stroke engine will not be greatly favoured, as the bore would have to be so small. The F.N. 52 mm. bore is extremely small in the opinion of the average British designer, and the most popular cylinder diameter probably will be nearer 60 mm. than 50 mm. However, the small bore offers the advantage that by its use the crankshaft is not unduly long, and the engine most suitable for a motor cycle must be reasonably compact.

It is not anticipated that there will be four-cylinder engines under 750 c.c. capacity, and for reasons already stated the bore probably will be between 50 mm. and 60 mm. It is not likely that designers will consider a bore larger than the stroke, therefore the largest bore will be that which will give a cylinder about 250 c.c. capacity with a stroke of the same dimensions—*i.e.*, a "square" cylinder—for the largest size of engine which will be used on motor cycles, while for a smaller size, say 800 c.c., the cylinders will be of 200 c.c. each.

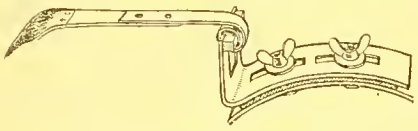
If we take some of the existing small engines—singles up to 250 c.c. and twins up to 500 c.c.—we find quite a number of bore-stroke combinations likely to be considered by designers of four-cylinder engines. Below is a list of such machines with the c.c. figure of a four-cylinder engine having cylinders of the same dimensions:

	Name.	Bore.	Stroke.	Capacity.	Four Cylinders.
Singles	Calthorpe, 2¼ h.p.	63 mm.	69 mm.	211 c.c.	844 c.c.
	Precision, 2½ h.p.	64 mm.	70 mm.	225 c.c.	900 c.c.
	Levis, 2¾ h.p. ...	62 mm.	70 mm.	211 c.c.	844 c.c.
	Peco, 2¾ h.p. ...	62 mm.	69 mm.	210 c.c.	840 c.c.
	Precision, 2 h.p. ..	65 mm	60 mm.	199 c.c.	796 c.c.
	J.E.S., 1 h.p. ...	51 mm.	57 mm.	116 c.c.	464 c.c.
	J.E.S., 1¾ h.p. ..	60 mm.	67 mm.	189 c.c.	756 c.c.
	O.K., 2 h.p.	58 mm.	72 mm.	190 c.c.	760 c.c.
Flat twins	A.B.C., 3½ h.p. ..	70 mm.	64 mm.	246 c.c.	984 c.c.
	Bradbury 3½ h.p.	68 mm.	68¾ mm.	249 c.c.	996 c.c.
	Brough, 3½ h.p. .	70 mm.	64½ mm.	248 c.c.	992 c.c.
	Douglas, 2¾ h.p. .	60¾ mm.	60 mm.	174 c.c.	698 c.c.
V twins	Precision, 4 h.p. .	60 mm.	88 mm.	250 c.c.	1,000 c.c.
	Enfield, 3 h.p. ..	60 mm.	75 mm.	212½ c.c.	850 c.c.
	Forward, 2¾ h.p..	56 mm.	70 mm.	172½ c.c.	680 c.c.
	James, 3½ h.p. ..	64 mm.	77 mm.	218 c.c.	992 c.c.
	Vindec, 4 h.p.	63 mm.	80 mm.	249 c.c.	996 c.c.

A PUNCTURE-PREVENTING DEVICE.

A New Method of Attacking an Old Evil.

A LONG-ESTABLISHED theory concerning the case of nail punctures demonstrates that in the case of a nail lying on the road with its head towards the front wheel of a motor cycle, the wheel passing over it tips it, owing to the impact of the wheel against the head; the time which elapses between



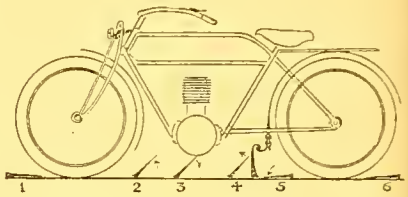
Monie's puncture preventer.

the front wheel and the back wheel passing over the spot where the nail lies is very short, and consequently the back wheel reaches the nail before it has time to fall to the ground, and strikes it while it is at a dangerous angle. This is one of the reasons why back wheel punctures are more frequent than those on the front wheel of a motor bicycle; and, of course, the fact that the front wheel strikes the nail with a rolling impact, and the back wheel strikes it with a driving impact, renders it all the more likely for the back wheel tyre to be damaged.

A Well-tried Device.

To overcome this possibility, Mr. M. M. Monie, Gatelawbridge House, Thornhill, Dumfriesshire, has invented a nail catcher fastened to the base of the rear mudguard, which consists of a light spring-mounted metal flap. This projects to within half an inch of the ground, and is designed to turn away the end of the nail which the back tyre approaches at a dangerous angle.

The inventor has very carefully tested the device. He found that after covering a distance of 11,036 miles in eighteen months without using his preventer he had forty-seven punctures in the rear tyre, while in twenty-seven months he covered 14,024 miles with the device in



Showing how the nail tipped up by the front wheel will puncture the rear tyre unless deflected.

use and had no punctures at all. Surely a most satisfactory result! The device, when put on the market, will only weigh a few ounces and cost a very few shillings.

SIDECAR RENOVATION.

ENAMEL versus PAINT.

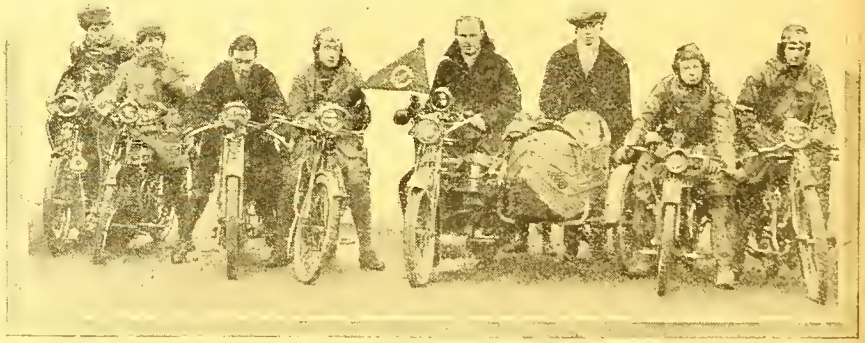
THE practice of using paint and ordinary varnish for sidecars has been followed because of the natural desire of painters recruited from the old coachbuilding industry to use materials with which they were familiar, but as the special suitability of enamel for motor vehicles has been appreciated, this latter material has come more and more into use. A beautiful coach finish was obtained by the paint and varnish system, but it was a lengthy, tedious, and expensive process, and the surface produced, excellent as it was, did not stand up as enamel does to the conditions to which the motor vehicle, whether in the form of the big touring car or the little coachbuilt sidecar, is subjected. Such conditions are, for instance, vibration, all-weather riding at high speeds, the abrasive effect of flying dust and particles of grit, etc., the action of road scum, mud, and occasional splashes of petrol, and spots of grease. Thus, apart from the simplicity and inexpensiveness of the enamel process as compared with the paint and varnish system, the former has the great advantage of producing a more durable and suitable surface. Further, the enamel process has the very big additional advantage that it can be carried out by an amateur and good results produced, and that, to-day, when skilled coach painters are so scarce, is a still stronger recommendation for the process.

The Choice of an Enamel.

The amateur should make certain that he is using an enamel which is suited to the work of sidecar renovation. However good an enamel may be for certain classes of work, it does not follow that it will be suitable for coating cars and sidecars which have, as explained above, to stand special conditions. Certain firms have specialised in the production of enamels for motor and cycle work, and in using materials supplied by such firms the amateur will have the satisfaction of knowing that he has the main ingredient for turning out a thoroughly good job.

The next important thing is the preparation of the surface to receive the enamel. A wash-leather, some common washing soda, pumice powder, and glass-paper are useful articles. Combined with a certain amount of "elbow grease" in rubbing down, they will enable the amateur to prepare a surface over which he can apply smooth coats of enamel that will finally approach good class coach painting. When a satisfactory surface has been produced by rubbing down, a coat of stopping enamel should be evenly applied. When dry, this should be followed by a coat of mat enamel, and this in turn covered with gloss enamel. If the work is carefully done, the result will be one of which any sidecar owner may be proud, but two coats of gloss enamel will make an even better job. Before applying the second coat of gloss enamel, the first coat should be slightly flatted down. It is important to use the right kind of brush for the work. Under no circumstances should a round brush be used for applying enamel. The correct brush for enamel work is a flat brush.

The above method will serve where a thorough renovation is desired, but if the enamel work is in a pretty good condition and only a "smarten up" is required, one or two coats of gloss enamel will make a good job, after the old enamel has been carefully washed with soda water and rubbed down with pumice powder.



Three prominent members of the Public Schools M.C.C., that active little body of keen young sportsmen, so many of whom have made the great sacrifice in their patriotism and devotion to duty. Third from left, the late Capt. R. L. Keller, R.A.F., hon. trials sec.; fifth from left, Clive Preen, hon. sec.; seventh from left, the late Lt.-Cr. P. C. D. Douglas, R.N.V.R., member of committee. It is to be hoped that when the war is over Mr Clive Preen, who fulfilled so ably the role of honorary secretary, will return safely and re-found the club, so that it may again assume its former activity.

WHY I AM A PELMANIST.

By "SAPPER."

Author of "Sergeant Michael Cassidy," "Men, Women, and Guns," etc.

Some months ago—more out of curiosity than anything else—I took up Pelmanism. I wished to find out whether there was indeed some new and wonderful system which could transform mediocrity into brilliance, and failure into success. Plentiful advertisements assured me that if I would but follow the advice laid down by the teachers of the Pelman School there was nothing I might not hope for, from a substantial increase in pay extracted from a stony-hearted Government to complete immunity from whizz-bangs. In view of the desirability of both these goals, I decided to join "the cult." I regarded it as a cult, in spite of all assurances from Generals, Admirals, Pillars of the Church, and other big noises in the Pelman world. I was sure there was a catch somewhere. So I borrowed the money for the course, and started looking for the catch. I am still looking. . . .

Now I do not propose to go into the question of how Pelmanism obtains its results. To attempt to do so would necessitate going into what Pelmanism is. If anybody wants to find that out, let him follow my example, borrow the money, and see for himself. He will never regret it.

But I do propose to say something of the state of mind induced by Pelmanism in a student who takes it up *in earnest*. For on that state of mind depends entirely his judgment of the system. On the personal result in his particular case the student will say, "This thing is bad—I would prefer a bag of nuts," or he will say, "This thing is good; why in Heaven's name didn't I do it before?" Those are the two judgments to which any new thing must be prepared to submit itself, and when it is as much advertised as Pelmanism the answer is of importance.

Now let there be no mistake about one thing: we are discussing the student who takes it up in earnest. The man who enrols as a Pelmanist, who reads the books and does the exercises like a parrot, and then sits down and waits for the boodle to roll in, will do a powerful lot of sitting. There is no magic word in the system; no formula which, repeated twice in the bath and once after breakfast, will produce success. There is nothing mystic about it—nothing supernatural.

Pelmanism is a system of education; nothing more, nothing less. Where it differs from other systems is that it educates. This is a very large claim, and one which great numbers of people will find incredible. They will point to all our methods of education and say frankly that it is ridiculous. They will quote at length from the many books that have been written about education lately—especially the public school system. If such a thing, they say, were true, our social system would be undermined. Personally I am not sure it hasn't been.

Let us consider for a moment this question of an education which educates compared to one which does not. So many people have written on the latter; so few on the former. It is so easy to criticise destructively. . . .

It is an undoubted fact that an intimate knowledge of the French irregular verbs, and the insensate demands of the gardener for pens, ink, and paper, will not materially help the student to travel through France.

It is an undoubted fact that the sole test for which we are trained is an examination; to that end, a boy is crammed and forced—and having passed it, nothing more matters. He can forget everything, and he promptly does, naturally.

It is a far, far better thing to throw explosive bombs at the science master than to dabble in abstruse chemical formulæ. The boy is not going to be a chemist—he wants to go into the Army. He is being taught what he doesn't want to learn. And so it is a failure. Thus the destructive critic fulminates, and everybody agrees that it is very dreadful. . . . But he suggests no alternative, and so everybody, after a brief mental upheaval, relapses again into sleep. Only Pelmanism has remained awake, and has produced an answer—a constructive answer, as, moreover, a successful answer, in the opinion of those who have tried.

It is successful because its students learn what they want to learn, and are therefore keen. A simple fundamental fact, wherein Pelmanism differs from all other systems of education; a simple fundamental fact which makes the difference between success and failure.

And so we come to the consideration of what is this thing which Pelmanism teaches, and which its students wish to be taught. It is well-nigh impossible to sum up the course in a phrase: it is altogether too big a thing. And yet perhaps it can be done—more or less. Pelmanism, as I see it, teaches human nature—your own and the other man's. It deals not with Greek Iambics or the Differential Calculus, though such is its nature that it will help the student to deal with these occult mysteries, be he so minded. It just deals with you and the other man, and life as one lives it.

There is no catch in it. It is a system developed along perfectly commonsense lines, which leads to a definite goal. That goal is Efficiency.

The system takes a man's thought-box and proceeds to tell the owner how he can improve it. It sends the student's brain to a mental gymnasium. It gives him concise instructions as to what he is to do, and when he carries out those instructions conscientiously he finds the system is right. He begins to realise that his mind is capable of being drilled and expanded exactly the same as his body. And, moreover, he finds that just as the fitter his body becomes the more work it can do, so the fitter his mind is the more it can accomplish. Things come easier to him: he has no difficulty in taking on more. His brain, in fact, is being drilled, and is developing accordingly.

Thus baldly—Pelmanism. The mind and brain are subject to laws, just as is the body. The teachers of this system have taken those laws—up to now the property, so to speak, of a few abstruse thinkers and philosophers—and built round them a simple, infallible method of developing a human being's efficiency. That is all: as I say, there is no catch. The work which they ask the student to do, and which the student must do, if he wishes to benefit by the course, is not long and arduous. It does not entail going back to school and poring over books. It can be done on one's way to work, when one is out for a walk, or wondering where the last one went to.

Moreover, there is another point which is worthy of note. The exercises—though only a means to an end—are in themselves interesting. There is no question of French irregular verbs, or abstruse chemical formulæ—to be forgotten as soon as learned. There is nothing irksome or tedious in the course; nothing that the student doesn't see the object of even in the early stages of his struggles. It is, in fact, a commonsense system, developed along commonsense lines, with its goal—Efficiency.

The results speak for themselves. From a financial point of view I personally am not qualified to speak, except to state the axiomatic truth that a man or woman whose brain is efficient must be worth more in the world market than one whose brain is untrained. And Pelmanism trains the untrained mind; that is its *raison d'être*. But from an intellectual point of view the thing can be put in a nutshell. It is not good to go through life blind; and yet thousands do so. Their brains are blind: they see and do not appreciate—they hear and do not understand. Pelmanism brings that appreciation and that understanding. Therefore it would seem worth while to Pelmanise, for it is certainly worth while to understand.

"Mind and Memory" (in which the Pelman Course is fully described, with a synopsis of the lessons) will be sent, gratis and post free, together with a full reprint of "TRUTH'S" famous Report on the Pelman System and a form entitling readers of "The Motor Cycle" to the complete Course for one-third less than the usual fees, on application to the Pelman Institute, 199, Pelman House, Bloomsbury Street, London, W.C.1.

The ROYAL ENFIELD Waiting List.

The demand for motor cycles in the period immediately following the cessation of hostilities is sure to be great. Everyone who has motored before in private life—and thousands of those whose first introduction to motoring has been in the theatres of war—will crave again for the freedom of the open road.

There is only one way whereby we can hope to give delivery on anything approaching a fair and equitable basis, and that is by executing orders in the future in rotation, as they are received now. We therefore commend to your notice our "Waiting List." We suggest that to make sure of obtaining your new Royal Enfield with the least possible delay you instruct us to place your name thereon without further loss of time.

We can still give delivery now of most of our standard models to clients holding Priority Certificates.

Catalogue and full particulars of all the Royal Enfield models promptly sent on request.

THE ENFIELD CYCLE CO., Ltd., Redditch, and 48, Holborn Viaduct, London, E.C.1.

Contractors to His Majesty's Government, the French and Belgian Governments, and the (former) Russian Military Authorities.

ROYAL ENFIELD

CURRENT CHAT

SPECIAL FEATURES

DESIGN OF SINGLE-LEVER CARBURETTERS.
LIGHTER LIGHTWEIGHTS. AN INGENIOUS CYCLE CAR.

TIME TO LIGHT LAMPS

SUMMER TIME.

Sept.	5th	8.8	p.m.
,,	7th	8.3	,,
,,	9th	7.58	,,
,,	11th	7.54	,,

Prize for Overloading.

At an American motor cycle meet last month two owners of sidecar combinations tied for a prize for the biggest family loads—each bringing six passengers.

The Petrol Squeeze in Spain.

Spanish motor cyclists are feeling the pinch with petrol at a guinea a gallon. Alcohol, ether, and similar substitutes are costing 12s. 6d. a gallon, so Spain is no motorist's paradise just now.

For Motor Cycling "Rookies."

If the machine peters out after a short distance, look at the carburetter. If tickling it does not result in it flooding, turn on the petrol tap. If nothing happens then, buy some petrol.

The Industrial Reconstruction Council.

A conference on Works Committees will be held under the auspices of the Industrial Reconstruction Council on Tuesday, September 10th, at 6 p.m., in the Hall of the Institute of Journalists, 2 and 4, Tudor Street, E.C.4. The subject will be introduced by Mr. Robert Wilson, of the Ministry of Labour, after which the discussion will be open. No tickets are necessary.

Home-produced Fuel.

We heard recently what was to us a somewhat startling item of information in connection with British mineral oil supplies. The oil shale of Scotland has long been known and used as a source of motor fuel, but this shale has to undergo several refining processes before its combustible constituents are accessible. Our informant, who is a highly qualified geologist, says that some three or four years ago he was present at excavations for church foundations in Bristol, and he found that the strata a few feet below the surface consisted of oil shale, which would ignite and continue to burn on the application of an ordinary match flame!

The deposit was many acres in extent and several feet in thickness. The "fly in the amber" lies in the fact that the area is covered with houses, and the shale, apparently, is too near the surface to allow of its being worked without endangering the buildings. The question may arise which is the more value, the houses or the fuel oil, as it has arisen in Cheshire over the salt.

A Veteran Motor Cyclist.

Considerable interest has been evinced in the recently-introduced Raleigh motor bicycle, and after the war it should become extremely popular as soon as it becomes known and the company are able to deliver to customers.

One of the oldest members of the Raleigh Co. is Mr. H. H. Monks, now general manager, who claims to have ridden one of the first motor bicycles brought over to this country. It was a 1¼ h.p. Werner, and was one of the first two machines Messrs. Werner Frères built about 1901. This was the old front-driven pattern, and from it the first Raleigh bicycle was evolved by Col. G. P. Mills, who was at one time the holder of the Land's End to John o' Groat's motor bicycle record, and at that time was with the Raleigh Cycle Co. It was front-driven after the pattern of the Werner, and Mr. Monks drove one of these machines for many thousands of miles, excepting when he was not mending the small round hide belt which was then used. One of the features of this engine was the small exhaust pipe, which projected from the side, and at night it glowed like a red lamp, causing considerable interest to those who met it on the road.

Since the early days of the motor bicycle Mr. Monks has not driven this type of vehicle very assiduously, but now the modern machine has been so far improved and his company has produced a very promising model he looks forward to the renewed pleasures of the early days on a thoroughly up-to-date machine in which he has great hopes when the petrol restrictions are cancelled.

Popular Machines.

A well-known dealer in the Midlands informs us that his biggest sales in motor cycles are for small two-strokes and 3½ h.p. well-known makes, the latter for passenger outfits.

Three-wheelers.

Never has there been such interest shown in three-wheel runabouts. At one time many of the motor cycle firms were seriously considering the light car proposition, but many have realised that the three-wheel runabout is more within their province. Given an adequate amount of capable attention in the designing, the three-wheeler is bound to be a success.

Mr. H. H. Monks, who has just completed eighteen years in the service of the Raleigh Cycle Co. He was one of the earliest motor cyclists in the kingdom.

Heavy Fuels.

Owing to the shortage of petrol in the Tropics, quite a number of machines are successfully using paraffin without vaporisers. Nevertheless, we should advise our colonial friends to fit some form of vaporiser.

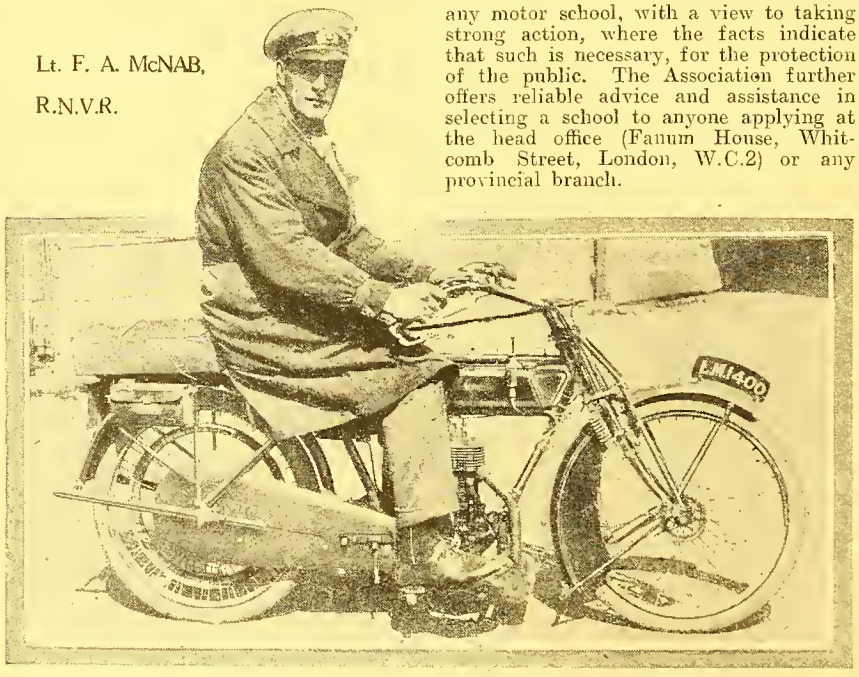
The Doughty Douglas.

Anent our report last week of the New Zealand races, in which a standard 1914 2¾ h.p. Douglas put up such a good show, we hear that another Douglas has been adding to its makers' laurels in South Africa, again competing with heavy American machines. In a fifty-one mile road race, rising 3,000 feet in thirty miles, the Douglas covered the distance in a fraction under 82m., and, still hot, put up the fastest time of the day except a 66 m.p.h. run of a Harley, in a half-mile open speed test—34⅖s.

Post-war Competitions.

Apropos our recent article on the single-cylinder in competitions, it has been suggested to us that separate competitions for different types of machines would be popular after the war. It is appreciated that the requirements of the owner of a single-cylinder machine are not identical with those owning big twins, and the former does not expect so much in the way of hill-climbing ability as the latter. Therefore, it is obviously unfair to the single to be forced to compete with machines of twice the capacity. Separate competitions for single-cylinder sidecar machines and for lightweights undoubtedly would be very popular, especially among private owners who, in the past, have realised that the handicap has been too great against them to justify their entering reliability trials.

Lt. F. A. McNAB, R.N.V.R.



Lt. F. A. McNab, R.N.V.R., who made a reputation in the motor cycle world as the skilful rider of a Trump-Jap. Those of our readers who know him will remember that he possesses the capacity for stowing his bulky form into the least possible space when mounted on his motor cycle. He has just returned from a holiday in the West Country on his 2¾ h.p. Sunbeam.

A West Country Hill.

Has any West of England reader climbed the hill from Kewstoke (Somerset) to Milton Hill top with a 3½ h.p. and sidecar? A West Country enthusiast asks this question, as he intends attacking this hill with such a combination immediately petrol is released.

The Motor Invalid Tricycle.

Recently we saw a very light form of invalid tricycle, fitted with a 2½ h.p. J.A.P. engine, which, incidentally, had an enormous silencer, and in consequence was very quiet. It was driven on one wheel only through a cycle type three-speed hub.

No Imagination.

At some of the seaside resorts the pony carriages are built to resemble four-seated motor cars complete with steering wheels. The other week we heard a youngster complain that "it was not like a real motor car," and wanted the pony attached to the back where he could not see it. The builders of such vehicles have no imagination.

Chain-cum-belt Drive.

From observations on the road during the munition holidays, it appeared clear that many owners of countershaft gear machines have not yet realised that the belt has to be maintained at a greater tension than is the case with an all-belt-driven machine. Unless the belt of a countershaft machine is almost "board taut," a great deal of power is lost through the belt slipping.

The A.A. and the Motor Schools.

The Automobile Association will be glad to hear from any student who is dissatisfied with tuition received from any motor school, with a view to taking strong action, where the facts indicate that such is necessary, for the protection of the public. The Association further offers reliable advice and assistance in selecting a school to anyone applying at the head office (Fanum House, Whitcomb Street, London, W.C.2) or any provincial branch.

Holiday Permit Prosecution.

The first prosecution occasioned by breach of the holiday permit rules came up at Matlock last Wednesday, when a munition worker was fined 10s. for motor cycling beyond the area of his permit.

Petrol Cigarette Lighters.

There is scarcely a munition worker who has not a petrol cigarette lighter. All shapes and sizes are in use, and most of them are "hand" made. In the munition centres quite a large business is done in wheels, flints, and springs.

Spare Parts.

During the period immediately following the declaration of peace manufacturers will have a busy time supplying spare parts for machines that have been laid up during the war and those that have "carried on" for work of national importance. It is several years since some of the models were made, and, stocks having run out, it is questionable whether all makers will consider themselves honour bound to replenish their stocks while their machinery will be required for their peace model outputs.

Colour.

Will black continue to be the favourite enamel for motor cycle frames after the war? Judging from past experience one is justified in thinking it will. Probably there are only two "coloured" machines which have been popular—*i.e.*, the Red Indian and the grey Clyno. It will be remembered that the blue Indian did not "catch on," and a well-known British concern which made "elephant grey" its standard colour tells us that the change from black was not a success altogether. Recently we heard the owner of a grey Harley remark that if the machine were only black and plated finish he would be entirely satisfied.

British Machines in the French Army.

The French Army employs a very large number of B.S.A. motor cycles, as anyone who has visited Paris during recent times is aware. Not only are these machines employed in the regions of security behind the lines, but they operate everywhere along the French front from Flanders to the mountains of the Vosges. Generally they are employed with sidecarriers, and often over the most abominable roads.

Much-abused Machines.

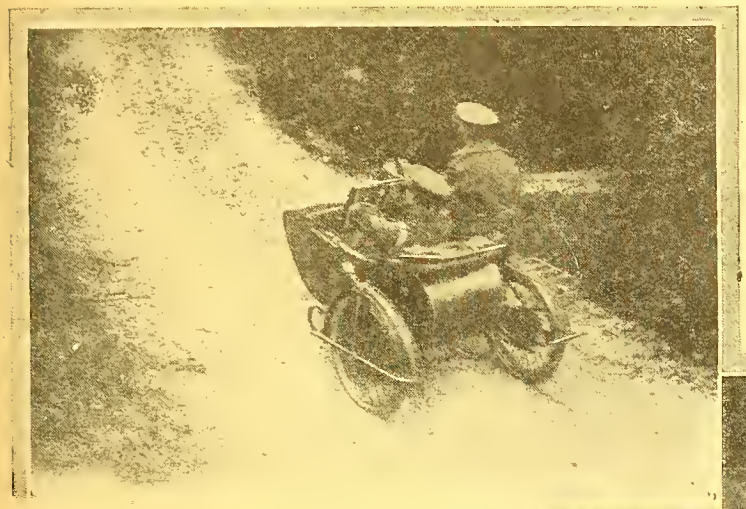
A correspondent, referring to these B.S.A.'s, writes us: "The French have the greatest respect for them, and so have we. Generally the men who ride them are chosen haphazard—infantrymen who have been wounded and drafted into non-combatant units. With all due respect to the French motorist, he has not much idea of driving a motor cycle—or, rather, his one idea *is* to drive it, heedless of road surface and everything else. I have seen motor cycles with their sidecarriers fully loaded, and with an additional passenger seated precariously on the top of the load, bumping at full throttle on middle gear over surfaces which we negotiate at walking pace. Also I have seen these machines, similarly loaded and badly driven, ascending the almost interminable mountain sides of the Vosges."

Middlesex Volunteers Explore Surrey.

Despatch-carrying Tests Approximating War Conditions.

CONTINUING the policy of training for such emergency as might require their active participation in the war, the Middlesex Volunteers conducted another despatch carrying and road finding trial in the Surrey Hills during last week end. The trial differed from its predecessor in that it deliberately embodied extremely difficult roads, notably Whitedown Hill, a chalky acclivity with a very rough surface, which climbs from the main road near Gomshall. The inclusion of this hill was not intended as a hill-climbing test as such, but as a conceivable obstacle to be met in exigencies of an emergency call, and it was useful as showing the capabilities of the machines and riders. The manner in which the men climbed this really steep and difficult hill was amazing, and the dexterity with which the sharp bend was negotiated, together with the prompt changing down at the incline immediately prior to the bend, spoke volumes for the efficiency of the men as riders. The most successful competitors were Sergt. Holmes and Pte. Read, riding Harley-Davidsons, who completed the trial and delivered all their despatches without a minute's departure from schedule time, and several other competitors rode so nearly to time that the test was eminently successful.

MIDDLESEX VOLUNTEERS TRAINING AS DESPATCH RIDERS.

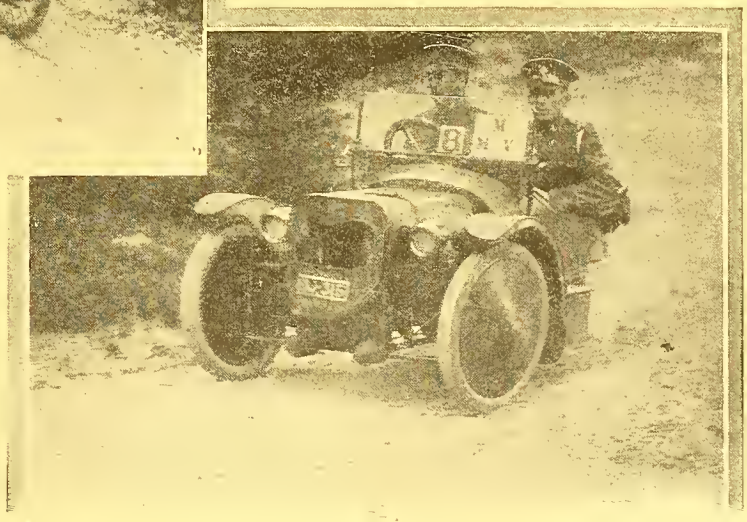


Sgt. Holmes (Harley-Davidson), the winner, climbing Whitedown Hill.

The main idea of these despatch-carrying tests is to train the men in finding their way without the employment of main roads, and, as a corollary to that, it may be mentioned that the majority of the competitors have learned something very desirable in regard to motor cycling, to wit, that there is infinitely more pleasure to be obtained and more scenic beauty to be enjoyed by the exploration of byroads than in keeping to the main arteries. Most of the men knew, or thought they knew, the district in which the trial was held, and it came as a surprise to many to find that it was possible to wind in and out of magnificent lanes and go from point to point without using the beaten track.

A Successful Test.

Every one of the riders completed the course, from a junior member mounted on a light two-stroke to the O.C. on a big car. The trial finished at Burford Bridge, but the return journey was made to Wimbledon Common under disciplinary conditions, the long procession of machines touring quietly under the control of the officers, whose management of the test was such as to compare very favourably with the work of trials organisers in the pre-war days.



A Morgan going well.

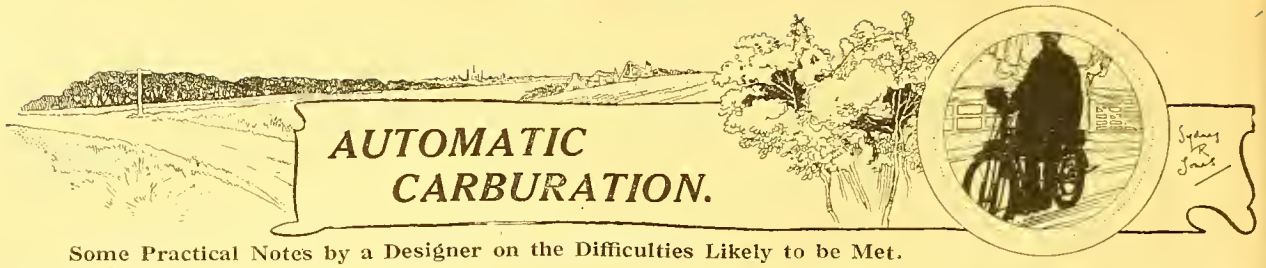
THE 1919 HARLEY-DAVIDSON. ONLY ONE MODEL.

THE Harley-Davidson Motor Co. have now published their programme for A.D. 1919, which, it is to be hoped, will be the first year of peace so long delayed.

The model chosen is the three-speed twin, with optional electrical ignition and lighting or magneto ignition. The handle-bars will be 2½in. wider than this season's model, and will be enamelled an olive drab colour to ensure minimum of necessary attention to cleaning.

Of course the price will be increased, but, once fixed, the company will endeavour to keep to it throughout the season.

A great deal of attention is given to the passenger and trade model sidecar attachments, which are of novel design.



AUTOMATIC CARBURATION.

Some Practical Notes by a Designer on the Difficulties Likely to be Met.

THE editorial remarks upon single lever carburation—issue July 4th, 1918—are sincerely to be welcomed by all who desire progress in motor cycle design. The more we can get together and discuss this subject, comparing notes and sifting individual evidence, the better will we come to understand what it is we really need and how near we can approach to its attainment. Much of our trouble is due to a very thorough disregard of data already determined and established.

Difficulties of Automaticity.

We may define ideal automaticity in a carburetter as any self-acting principle which of itself will maintain the gaseous mixture at a constant and uniform value at all times and under all conditions.

Briefly considering some of the difficulties in the way of automatic action, we find the chief of these to be variable motor speed, variable throttle area, and variable temperature. It is possible to compensate automatically for the first two variables, simply by the design and arrangement of the mechanical parts of a carburetter. There are several alternative principles of automaticity which, at a constant temperature, can be made to maintain automatically (that is, without a controlling member other than the single throttle lever) a constantly proportioned gaseous mixture under widely varying degrees of throttle opening and engine speed.

When we come to the effect of temperature variation, however, quite a different state of affairs obtains, because no reliably automatic compensation has so far been recognised for variations of temperature.

It is probably correct to say that the ignored effect of temperature upon the liquid fuel flow is largely responsible for the alleged extravagance and inferior power obtained with the automatic carburetter on motor cycles, for the following reasons:

It is well established that in the case of liquid fuels passing through a small orifice, a rise in temperature of the liquid fuel will considerably increase the rate of flow through such an orifice per unit of time. With fuel of 0.760 s.g. an increase in flow of 20% may be expected when the temperature is raised from 60° to 90° F. (Brewer's "Carburation," page 52). Sorel also gives an increase of 18% for a similar temperature rise. In addition, it has been found that the amount of vapour which can be retained by the air is largely increased by quite a small rise in the air temperature.

Vapour to air proportions possible with 0.650 sp. gravity fuel are given by Sir Boverton Redwoood as:

17.5 per cent. by volume at 50° F.
27 ,, ,, 68° F.

Now, between the starting and the normal running conditions, there is a considerable change in the air and fuel temperatures. The result is a considerable increase in the liquid fuel proportion as normal running temperature is reached, due to the increased fuel flow and increased ability of the air to absorb such an excess of flow. So that if the carburetter is adjusted to give a correctly proportioned mixture at starting temperature, an abnormally rich mixture must be expected under normal running conditions, while if adjustment is made for running temperature much difficulty will be experienced at starting due to insufficient fuel flow.

Clearly, then, we need a supplementary means of adjustment (other than the single throttle lever) which will enable us at starting to bring the fuel flow up to an artificial value. And since this adjustment has to be remade some time between starting and normal running it may just as well be effected from the handle bar in the case of a motor cycle. *But this control should be merely a temperature and fuel density corrector, and be independent of the natural automatic action of the carburetter. So that at a given temperature setting a single throttle control alone would give all variations of speed and power, and give them with economy, because ease of starting would not imply an abnormally rich running mixture.*

In car practice the same starting difficulty is experienced and is met, sometimes by the provision of an air-strangler, sometimes by copious priming, sometimes by choking the air ports with a convenient duster, and too often by the sacrifice of running economy in order to obtain ease of starting.

Air-gas Ratio.

When considering the question of automatic *versus* non-automatic carburetters there is an aspect of the case which is probably often overlooked, and that is the permissible range of mixture strength. It has been demonstrated that while there is an ideal air-gas ratio, giving greatest all-round efficiency, the limits of combustion are set in mixtures richer and weaker than this ideal. An upper limit was found in experiments by Dr. Watson to be in the neighbourhood of 19.4 by weight of air to 1 of fuel, while combustion also occurred with an 11.7 to 1 mixture, greatest thermal efficiency being obtained with a 15 to 1 ratio, so that in the case of the non-automatic instrument how can one expect to approach the ratio of maximum thermal efficiency at every change of load or throttle? It is not enough to keep in the regular firing range, because this also embraces extremes of mixture strength, giving high fuel consumption and inferior power. The same thing applies to the automatic carburetter, too: but here it is a case of making a temperature adjustment, and leaving the mixture strength at various speeds and throttle openings to be determined by whatever automatic principle is embodied in the carburetter design.

G. H. JONES.

THE MOTOR CYCLE

AVIATION SECTION

Well-known Professor Killed. Flying Ten Years Ago.

Democracy's War Machine.

"The aeroplane is democracy's most effective war machine" is a statement made by Viscount Northcliffe.

—◇□◇—

The Pilot's Mascot.

Many and varied are the mascots carried by Service fliers. These embrace every imaginable variety of object—jade hearts, bangles, dice, white mice, teddy bears in all degrees of corpulence, flying helmets which have proved talismanic in the past, pipes, and even silk stockings.

—◇□◇—

"Stick it, by the gods, until we win."

Plane News is the name of an aviation paper published by American officers in France. The editor says in one of the issues: "Our policy is to do everything within our means to help win the war, to encourage our pilots to get the hated Boche—every one they go after—and, as the English say, "Stick it, by the gods, until we win."

—◇□◇—

A Gallant Rescue.

On the occasion of one of our aeroplanes being driven down by hostile fire in the enemy lines, Capt. Frank Nuttall, R.A.F., who was flying at the time, brought his machine to the ground beside the damaged aeroplane, dispersed the enemy with his machine gun, took the stranded pilot on to his own machine, and got safely away. This gallant deed earned for him the Military Cross.

—◇□◇—

A Well-known Professor Killed.

The nation has had a sad loss in the death of Maj. Bertram Hopkinson, Professor of Mechanism and Applied Mechanics at Cambridge, who was recently killed in a flying accident near London. Maj. Hopkinson was one of our leading Army technical experts, and did much valuable work with indicator diagrams in connection with internal combustion engines and aeroplanes.

Prominent R.A.F. Officer Honoured.

Maj.-Gen. Salmond, C.M.G., D.S.O., R.A.F., has been appointed C.V.O.

—◇□◇—

Maximum Price for R.A.F. Officer's Tunic.

The War Office announces that R.A.F. blue cloths for officers' service dress will shortly be available to tailors, who may not charge more than £7 10s. for a tunic, exclusive of badges and badges of rank.

—◇□◇—

Tangents of Observation.

A correspondent in *The Aerial Age* sends an interesting letter in which he calculates the tangents of observations on the water's edge for different altitudes of aeroplanes, and gives them in the following table:

Aeroplane Altitude. Miles.				Observation Tangent. Miles.
¼	...	1,320ft.	...	44.3
½	...	2,640ft.	...	62.7
1	...	5,280ft.	...	88.6
2	..	10,560ft.	...	126.1
3	...	15,840ft.	...	154.3
4	...	21,120ft.	...	178.0
5	...	26,400ft.	...	199.3
6	...	31,680ft.	...	217.8

A squadron of scout aeroplanes and a group of pilots who have done good work in France.

A New Engine.

It is stated that the Curtiss Aeroplane Co. is endeavouring to develop an aeroplane with an engine of its own make said to be more powerful than the Liberty motor. Details of the new machine are withheld.

—◇□◇—

Retrospection.

Ten years ago this month, the prize of £400 offered by M. Armengaud, jeune, for a flight of fifteen minutes' duration was won by Henry Farman at Issy. Earlier in the year, Farman had wagered £500 with M. Charron that before the end of the year a flight of one kilometre would be made with two passengers up, which feat was performed by M. Farman himself, when he rose to a height of forty feet above the ground! About this time Wilbur Wright arrived at Le Mans to attempt a circular flight of fifty kilometres for a prize of £20,000. His chances of success were held to be slender. What amazing changes in one short decade!

—◇□◇—

"Boys" of the old R.N.A.S.

Aviators of the old R.F.C. are still complaining that boys in the R.N.A.S. who have never been Overseas, some of whom have never seen any fighting, were promoted from second-lieutenant to captain on the amalgamation of the two services, whereas experienced flying second-lieutenants of the R.F.C. were only advanced to the rank of first-lieutenant.

—◇□◇—

Comparative Aerial Strength.

"The aerial supremacy of the Allies enabled them to achieve their advance on the Somme. At once the whole German aeronautic department was reorganised, with the result that to-day, in aerial strength, the Germans appear to be equal to the Allies." This statement is from *The Outlook* (U.S.A.). The remark about equality is open to question—at any rate there are many opinions on that point.

About Night Bombing Raids

BY TORQUE.

A British bombing 'plane about to start upon a night raid. The photograph was taken under searchlight.

THE DIFFICULTIES OF NAVIGATION IN DARKNESS.

A LITTLE thought will show that the organisation of a night-bombing campaign demands an immense amount of ingenuity and attention to detail; and this is particularly the case with raids conducted wholly over land. Navigation to a definite objective is the first problem. Water is unquestionably the best direction indicator which a night-flier can have: even on the darkest nights the surface of water collects and reflects what little radiance the night may hold. But lakes and rivers and canals are not visible from 8,000 feet except on bright, moonlit nights when searchlights and Archies and defence planes enjoy their best opportunities. It is perhaps for this reason that Jerry has established lighthouses behind his lines—apparently low towers, capped by electric flash and glow lamps of various colours. Such lighthouses may serve two purposes. On the one hand, they enable an outgoing pilot to strike a desired map and compass course, which he will hold until some natural object, such as a river, shows him that he has travelled far enough. Furthermore, the lighthouses assist him to pick up his aerodrome on his return.

The Trials of the Ground Officer.

The difficulties of navigation scarcely exceed those of the ground officer in charge of the aerodrome. Perhaps eighteen giant 600 h.p. machines have to be got off. They are all paraded before him in the darkness, and their thirty-six engines are roaring. He has:

(*a*) To get them all off without risking a collision.

(*b*) To receive a weather report from the first man up, as soon as that individual has climbed high enough to get a distant all-round view.

(*c*) To allow extra getting-off time to any pilot whose machine gives a little trouble at the last minute.

(*d*) To give permission to any pilot who may wish to land again for any reason.

(*e*) Perhaps to recall the whole squadron if the weather is unsuitable.

However, we will suppose that he gets his entire squadron off without incident. Then his anxieties begin. Just before the squadron is due to return, a Gotha arrives overhead and blows some huge holes in the landing ground, each of which will "crash" any of his machines which fouls it in alighting: and twin-engined machines may cost from £5,000 to £20,000 apiece. Is there time to fill the holes up before his men land, or must they be shown by mark lights?

The Homecoming.

Presently the "want-to-land" signals of his own men are perceived overhead. Has Jerry gone away yet, or is he waiting near to bomb the machines after landing? He must not let the air get too full of his own men, or they will collide with each other. He must not show the landing lights if a Hun machine is anywhere handy, and, if the air is humming with exhausts, it is not easy to be sure that a Gotha is not lurking among his Handley-Pages. Perhaps a dozen machines are all showing "want-to-land" signals, and only one can land at a time: care is needed to prevent two machines landing together through confusing his signals. On the other hand, some of the men overhead may be wounded—blood spouting from their arteries: in any case they are sure to be half-frozen. Some of the planes may have been so badly damaged by enemy gun-fire, and be barely capable of remaining aloft. A pilot may signal that his petrol tank is holed, and that he *must* land at once. A machine may "crash" right on the landing spot through a blunder by its pilot, and a 6 or 12 ton 'bus is not easily or quickly "cleared" after a bad smash. The longer the squadron landing takes, the more chance that the various lamps and signals will attract the attention of some wandering Hun, seeking for a juicy target.

On the whole, it is possibly better to be a night-bombing pilot than to be ground officer of the squadron's aerodrome.

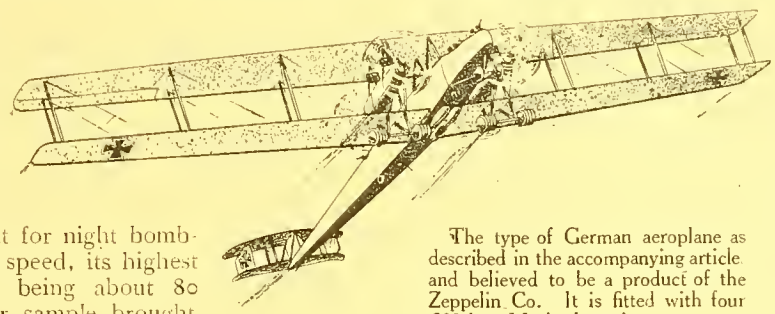
TORQUE.

THE FOUR-ENGINED GOTHAS.

A Description of the Latest Product of the Zeppelin Co.—a 1,200 h.p. Bombing 'Plane.

THE Censor has released for publication a full technical description of the four-engined Gotha shot down by the French last June. I am indebted to the *Aeroplane* for the details quoted below.

This enormous 'bus is approximately 19ft. high and 71ft. long, the wing spread being no less than 133ft. It has four six-cylinder vertical engines (Maybach) of 300 h.p. each. The engines are mounted in pairs in nacelles set between the wings on either side of the fuselage, and are equipped with small flywheels and clutches. The two-bladed propellers are 14ft. long, and the total weight is in the neighbourhood of twelve tons. The extraordinary strength of the "wood, wire, and cloth" construction used in the manufacture of aeroplanes is exemplified by the small size of the ash "longerons" — the four main fore and aft members of the fuselage; they are no more than 3in. × 3in. in section.



The type of German aeroplane as described in the accompanying article and believed to be a product of the Zeppelin Co. It is fitted with four 300 h.p. Maybach engines.

The machine is built for night bombing work, and not for speed, its highest pace under full load being about 80 m.p.h. The particular sample brought down last June was fitted to carry two bombs only, their probable weight being about one ton apiece. Minor modifications in the fittings would enable a large cargo of small bombs to be carried.

The fuselage appears to be planned for a minimum crew of eight men. A machine-gunner occupies the nose of the fuselage. Behind him are the controls, arranged for two pilots, who sit side by side and take turns in managing the unwieldy monster. Behind them is the wireless operator. All these four men sit in front of the leading edge of the wings. A couple of mechanics are accommodated level with the leading edge, and the "centre section" between the wings is occupied by the colossal petrol tanks. These were practically destroyed in the machine under notice, but it can easily be estimated that for, say, an eight hours' flight tankage for something like 1,000 gallons must be provided—an excellent target for incendiary bullets! A passage between the tanks gives access to the rear cabin, which is really a gun turret, at least two gunners being its normal crew. These guns can be fired in absolutely any direction, subject to the obstructions caused by the tail, nacelles, and wings. A hinged trap-door in the floor permits a good arc of fire in a downward and astern direction. I have heard civilians with flying experience say that they would rather ascend 5,000ft. in an aeroplane than stand on the verge of an unfenced cliff 200ft. high, because a fuselage is so boxed in that there is no sensation of giddiness even for a nervous passenger, but peering through an open trap-door at 12,000ft. would probably make such people giddy. The field of fire is good enough to make the big Gotha quite an awkward customer to tackle in darkness, when it cannot be "rushed" by a fast scout, because it is so difficult to see.

The minor fittings include six bulky fire extinguishers, and a complete electric light equipment.

The landing of these twelve ton 'buses is notoriously difficult. Undercarriages are fitted under each engine nacelle, and each axle carries eight pneumatically-tyred wheels to ease the shock of impact. A lighter and shorter undercarriage, fitted with two wheels only, is mounted under the nose of the fuselage.

According to the French authorities, this giant Gotha is very possibly a product of the Zeppelin works. **D.**

CHASSEURS DES BOCHES.

"*MON GENERAL*, when I face the Boche, when I think I really have him at the muzzle of my gun, I shut my eyes and squeeze the trigger. When I open them, sometimes I see my adversary dissipated in space, and sometimes I see the blank walls of a hospital!"

Thus Charles Nungesser, the great French ace, to General Nivelle, who was interrogating him.

I have had to read, as a matter of course, every obtainable printed book on aeronautics that has been published during the last three or four years, and indeed I know of no writer on the subject more brightly readable (and yet at the same time so truly informative) than M. Jacques Mortane, whose book "Chasseurs des Boches" (four francs, L'Edition Française Illustrée, 30, Rue de Provence, Paris) lies before me now. There is a gaiety and *entrain* about the little silhouettes of air-fighting which is often far to seek in the autobiographical writings of the fighting pilot.

Says one ace, speaking of methods of attack: "You have seen at the music-hall those amusing ones who execute innumerable somersaults on an outstretched rubber carpet? Imagine that is a Boche, and you have to kill it. Aim at the head. Notwithstanding the rotation of the body, you would be able to place several bullets in the head."

Aside from a lot of compressed information which would be of great value to young pilots, the volume contains vivid and picturesque accounts of the doings of a number of the well-known aces—English, French, and American. The French is not difficult, and if you read M. Mortane, you cannot but like him for his very manifest enthusiasm. R.H.B.

A GLOSSARY OF FLYING TERMS.

In the interests of those motor cyclists who are not very familiar with the names given to the various parts of an aeroplane and other terms used by the Air Services.

(*Continued from page 124, August 8th.*)

FIN.

A small panel, constructed on the same system as a plane, but mounted vertically above the fuselage towards the tail. It serves to secure balance in the "keel surface," *i.e.*, the amount of surface shown in a side elevation of the machine and a proper disposition of the keel surface is necessary to both directional and lateral stability. Directional stability gives an aeroplane a tendency to hold on to a course, and depends upon there being more keel surface behind the vertical line on which the machine pivots than in front of it. Fig. 1 shows the keel surface of

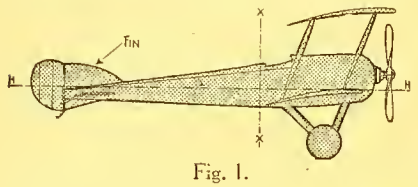


Fig. 1.

a biplane, and its vertical axis or pivoting point. It will be noticed that there is a greater area of keel surface in front of the axis X than behind it; but the rear part of the keel surface exerts more leverage, owing to the length of the fuselage, and is therefore as effective as a bigger area mounted close behind X.

This arrangement of the keel surface gives directional stability as follows: The aeroplane, let us suppose, is flying due north, as in fig. 2, when a gust from the N.W. strikes it. This gust, impinging on the keel surface behind the axis X, swings the aeroplane round till it points N.W., as in fig. 3. But the aeroplane

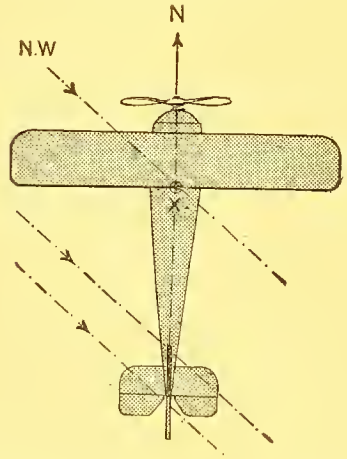


Fig. 2.

does not fly due N.W. because it happens to be pointing N.W. It has all the impetus of its previous due north flight at perhaps 150 m.p.h. behind it, and though it now points N.W. it is flying N.N.W., as a compromise between the N. impetus and the effect of the N.W. gust. Its body is lying at an angle across its present N.N.W. course. Thus, the keel surface behind X is subjected to the enormous air pressure generated by the N.N.W. course along some such line as Y (fig. 3), and the machine straightens itself back under this pressure into its old course due North. This automatic correction is perpetually occurring in flight

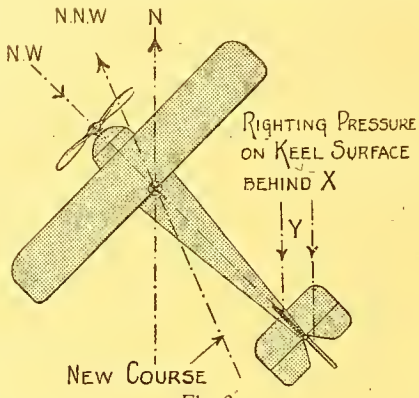


Fig. 3.

without the pilot's knowledge. If the wind is strong enough to produce perceptible aberrations, the leverage of the keel surface will probably prove too weak to correct them.

The keel surface must not only be accurately proportioned fore and aft of the vertical axis X, but also above and below the horizontal axis H (fig. 1). If there is no more keel surface above H than below H, a side gust would tend to roll the machine over with the top leading. If the excess of keel surface were below H a side gust would roll the machine over, bottom leading. If the keel surface above and below H is equally balanced a side gust will merely blow the machine bodily sideways off its course for a moment

The fin is very useful in perfecting experimental machines when petty errors have occurred in design, as a small alteration in its area or mounting will make a considerable difference to stability.

FLAP.

A slang term for ailerons, *q.v.*

FLYING POSITION.

A misnomer for "rigging position." An aeroplane assumes practically every conceivable position during its flying life, and has no fixed "flying position." The designer, however, must specify a given position of the machine, as a basis for the riggers to adjust the wires, set the control surfaces, stagger, angle of incidence, dihedral, etc. This position should be called the "rigging position," and the maker's instructions always specify what it is. As a rule, the aeroplane has its tail packed up (see fig. 4) until a spirit level shows that the engine bearers are absolutely horizontal, both longways and crossways.

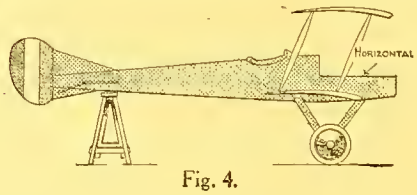


Fig. 4.

FLYING WIRES.

The wires which transfer the lift of the wings to the fuselage. The flying wires of a biplane are shown in fig. 5. They are duplex, owing to the grave risk of the wings folding upwards if a flying wire

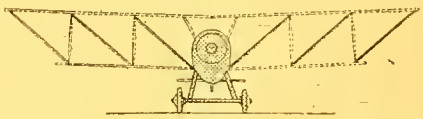


Fig. 5.

fractures or is shot through. As the drawing shows, they run upwards and outwards from the bottom centre.

FRICTION (SKIN).

Viewed through a microscope, the edge of a razor resembles the contour of an Alpine range. Similarly, the air is quite sufficiently sensitive to notice the difference between a roughly planed strut and a varnished strut, between varnished fabric and fabric in its natural state with minute irregularities between the crossed threads. "Skin friction" is the term used to describe the total of all the miniature "drifts" caused by small unevennesses of surface in an aeroplane. Consequently, all the major surfaces are both streamlined in their general contour, and also made as smooth as possible in the most trifling detail.

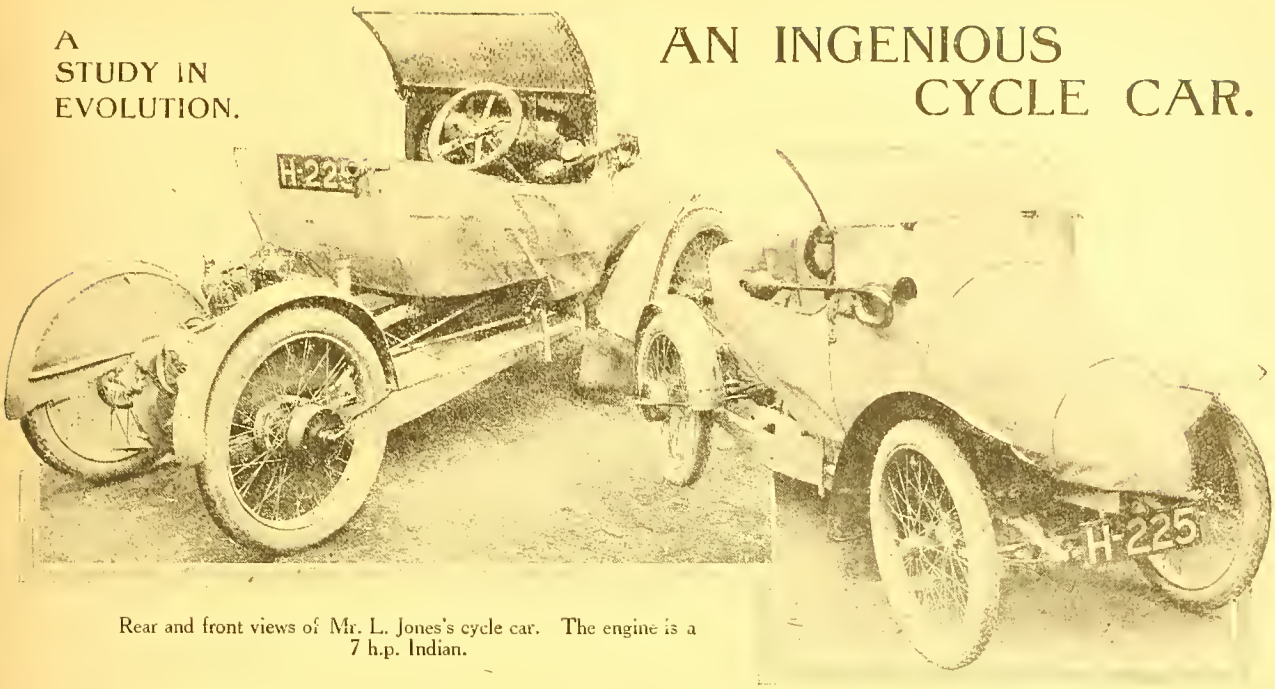
FUSELAGE.

Fussy authorities on flight usually frame their own definition of this rather elusive term. In the case of a tractor biplane it may safely be applied to the whole length of the central framework, which supports the engine and the pilot at its fore end, and the tail plane, rudder, and fin at its aft end. Nevertheless, as the pilot's cabin is properly known as the cockpit, some people define a tractor fuselage as "the framework which connects the cockpit to the empennage." In the case of a pusher machine the pilot's cockpit is usually called a "nacelle," and the fuselage is limited to the framework connecting the tail portion of the machine to the main lifting surfaces. A pusher fuselage is described as an "open fuselage," and its side members are known as "tail booms."

The Aldis sight which is used in connection with fixed guns firing through the propeller has been copied as regards the optical features in America from an English instrument, but the construction has been modified in such a way that the behaviour of the instrument in actual use will be very much improved.

A STUDY IN EVOLUTION.

AN INGENIOUS CYCLE CAR.



Rear and front views of Mr. L. Jones's cycle car. The engine is a 7 h.p. Indian.

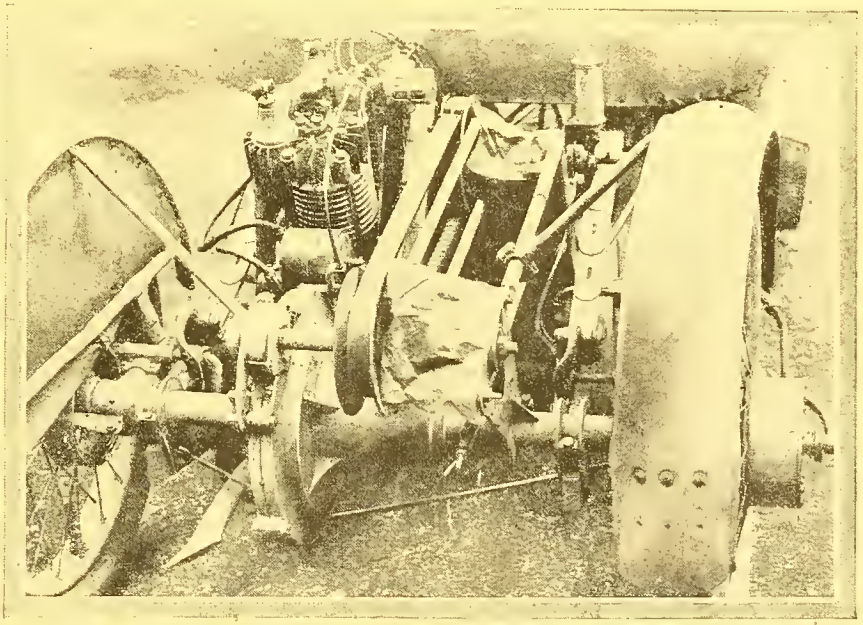
ONE of the foremost motorists in the United Kingdom and one of the oldest readers of *The Motor Cycle* is Mr. Leonard R. Jones, of North Finchley, London, N.W., whose name has been familiar to our readers since 1903. It was as long ago as June 8th, 1916, that we published an article entitled "A Modernised Motor Tricycle," which was practically a cycle car evolved in gradual stages from the original De Dion tricycle which Mr. Jones rode in the famous S. F. Edge Thousand Miles Trials fifteen years ago. It has since undergone further developments, and now he has succeeded in producing a most ingenious cycle car, which, in its mechanical details, still bears some little resemblance to early tricycle and quad designs.

As we have previously stated, Mr. Jones is an amateur mechanic and engineer, and all the work done in erecting the vehicle was carried out in his own workshop. The most interesting part of the vehicle is the gear, which is of the expanding pulley pattern, but incorporating a new principle which we are not at liberty to disclose at the moment pending patent arrangements.

Novel Clutch Design.

The motive power is supplied by a 7 h.p. 1914 Indian engine. When purchased some parts were missing, and though its owner was successful in purchasing one inlet dome, he was unable to procure another, so he had a casting made and finished it himself.

The rear axle has been taken from an old Ariel quad, and comprises a differential, while one of the most interesting features of this vehicle is the hydraulically-worked clutch, which is shown on all the pictures on the off side rear wheel hub. The plate portion of the clutch is similar to that of an ordinary plate clutch, the plates being alternately keyed to the outer shell of the driving member, but their separation and engagement are effected by means of a leather bucket controlled by oil. The withdrawal of the oil by means of a pump actuated by the clutch pedal results in the bucket sliding towards the left-hand side of the hub shell (see the illustration), and at the same time allowing the plates to separate, while on the clutch pedal being released the oil is allowed to flow back, and forces the bucket away from the left-hand side of the shell and presses the clutch plates together. There is very little leakage, but occasionally a little oil leaks through with advantage to the plates, and any excess of oil may be afterwards drawn off and returned to its previous position by way of the lubricator shown in the rear view of the machine and situated just above the off-side body spring. If it is required to keep the clutch out permanently the driver closes a tap, which is easily accessible from the driving seat, which will prevent the flow of oil back to the pump and reservoir and keep the plates separated.



Rear view, showing engine and transmission. The details of the expanding pulley gear are hidden, as the patent is not yet complete. The small screw just below the gear bracket spindle enables the belt to be tightened in a very simple manner. Note the peculiar clutch on the offside rear wheel.

An Ingenious Cycle Car.—

The body is constructed of wood and canvas, and is suspended on cantilever springs at the rear and on full elliptical springs in front, but all the mechanical parts of the vehicle are unsprung. The weight of the car complete is 5 cwt. 2 qr. Parts of the old quad can be recognised; for instance, the steering is practically the same, except as regards the wheel, but new stub axles have been fitted, and the frame has been strengthened considerably and stayed by two ash members. The front portion of the engine is fastened on to the cross member and the rear to the differential casing, while in front of the engine is a board which acts as a wind scoop. It is interesting to note that a steel petrol pipe is fitted, which is found to be quite satisfactory and far more durable than a copper pipe.

Engine Details.

The fine steel tube, through which the warm air passes to the carburetter, is capable of movement by means of a milled screw underneath the jet chamber, so that as this tube is raised or lowered more or less petrol can be made to flow through the jet.

So far as the lubrication is concerned, the standard Indian oil pump is retained, but Mr. Jones has improved upon the lubrication system to a considerable extent. Oil from the reservoir can be introduced to the crank case by means of a pump the plunger of which works on a quick thread. When oil is introduced by this means the tap on the short pipe leading from the tank to the main oil pipe is closed. As the plunger is screwed down the oil is forced through a non-return valve on the off-side of the engine. When a full charge has been inserted the mechanical Indian oil pump performs its usual functions, namely, to keep a constant level of oil in the crank chamber. This is effected merely by turning on the tap at the base of the reservoir. The pump is now free to draw in oil to the reservoir as it is required, and oil no longer flows down to the non-return valve, as there is no pressure thereon, and consequently it is drawn straight into the engine, and the hand pump is then put out of action until required.

The plugs fitted to this machine are Mr. Jones's own invention. They are very short and are insulated by porcelain and mica, which possess the great advantage of not being affected by heat; since he has made these plugs Mr. Jones has never had to renew one.

A Quiet Drive.

Reverting again to the transmission, we ought to mention that the large wheel in the differential is made of two steel plates with fibre in between, riveted together, which has resulted in a noisy drive being converted into an entirely silent one. The gear gives a range from 3½ to 11 to 1, and the belt has run 1,400 miles and is still in good condition, while it may be noted that Mr. Jones actually made his own belt fastener. The machine is used daily in connection with its owner's work as surveyor in connection with Local Government Board work, and has served him faithfully. The clutch is particularly satisfactory, and has given no trouble for 9,000 miles' running.

With their love of realistic effect, the Americans have gone one better than we in their model tank displayed in New York City for recruiting purposes by connecting up the exhaust of a 7-9 h.p. Indian to the dummy machine guns to simulate gunfire—a startling method of attracting attention.

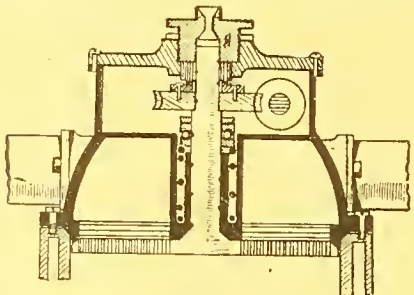
A NEW ROTARY VALVE.

A Geared Down Rotating Valve within the Combustion Head.

CONSIDERING the amount of thought expended upon designing rotary and sleeve valves for internal combustion engines, it is significant that the poppet valve is still the most general type. In motor cycle and aeroplane engines the poppet valve is used exclusively. Nevertheless, the fact that the rotary valve so far has not been proved more efficient than the conventional poppet type is no proof that the former will not be developed until it is the superior type. Such valves have the advantage of silence in operation, and this reason alone induces many inventors to attempt to solve the problem.

A Rotary Disc Type.

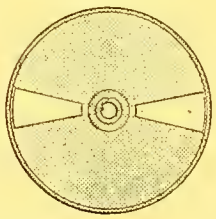
The rotary valve design shown here is the patent of Mr. Duke W. Harding, of Lechlade, who claims for it, among other advantages, better scavenging, elimination



A rotary valve patented by Mr. D. W. Harding.

of pocket in the combustion head, even distribution of heat, and a tendency to better cooling.

The valve is a rotary disc, in which ports or apertures register with similar openings contained in the seating of the valve. The valve face is held against its seat by the action of a spring, operating on the stem of the valve through a thrust bearing. As shown in the patent specification, the valve rotates at one-quarter engine speed, and the valve chamber has four compartments, each one having an inlet or exhaust pipe. Each chamber is connected with the cylinder by one of the ports cut in the cylinder head.



The rotating valve, showing the two ports which operate both inlet and exhaust.

The valve is rotated by a worm or other suitable gearing. On the upper side of the gear wheel on the spindle is fixed a cam member. This bears against another cam fixed in the head of the stationary chamber.

The cycle of operation is as follows:

Just before the beginning of the suction stroke the two ports in the valve uncover the two inlet ports in the chambers situated diagonally opposite each other and connected to the carburetter by pipes, and, by continuing to rotate, close them at the completion of the stroke.

Details of Working.

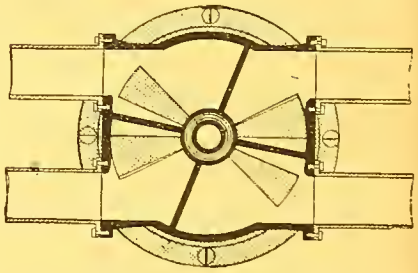
During the compression stroke the cam on the spindle, as it rotates, comes into contact with the stationary cam, thus taking any pressure, set up by the explosion, off the valve face, the cams breaking contact at the end of the firing stroke or at any point found desirable.

The valve remains closed during the compression and firing strokes, but continues to revolve. Just before the end of the firing stroke the valve uncovers the two exhaust ports connected with the two other chambers in the cylinder head which are connected to the exhaust box.

At the end of the exhaust stroke the valve again uncovers the inlet ports, and so proceeds through its cycle.

Valve Lubrication.

The lubrication of the valve is carefully thought out. Oil is fed through a hole in the top of the spindle, and is conveyed by oilways cut in the spindle down to the centre of the valve face, oiling all parts on its way. Oil ducts are drilled through the valve seat, and there are grooves in the valve face. Any oil that escapes from the groove at the top of the spindle is thrown on to the operating gear, and all excess oil finds its way to the recess



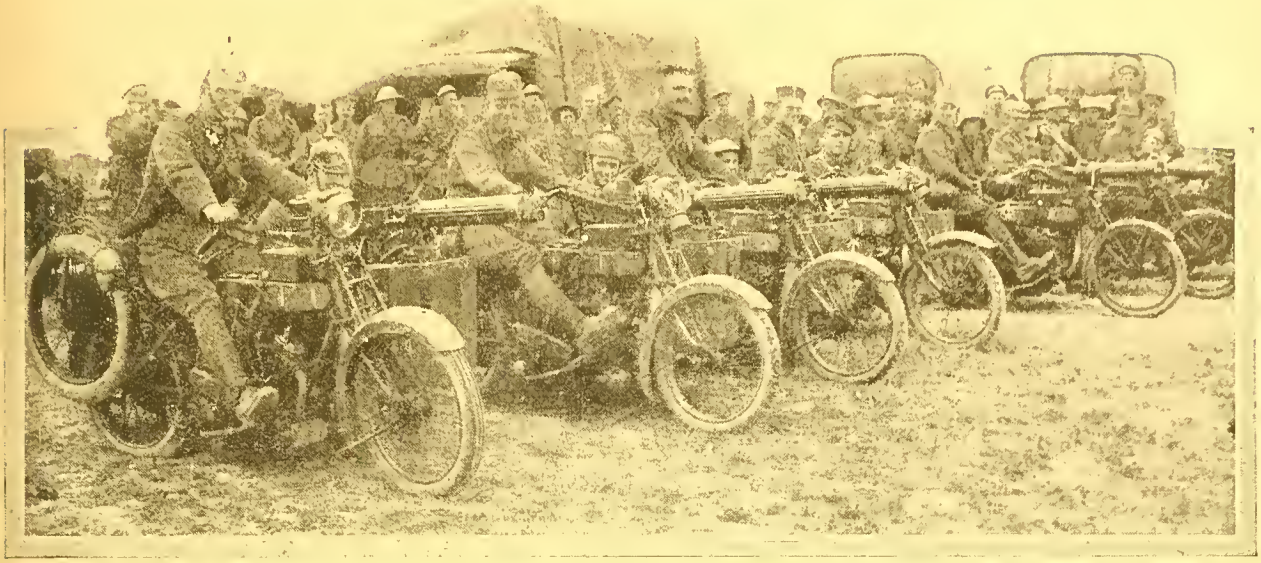
Plan view of the valve chamber.

between the spindle and the centre of the chamber containing the spring, when, if desired, it may be returned to the oil pump.

Such a valve gear as this should be silent, and there appears to be no reason why it should not be successfully applied to a motor cycle engine.

MILITARY NOTES.

A.S.C., M.T., in Persia. Adventures of an R.A.F. D.R.



We gave extracts in a recent issue from descriptions of the gallant work the M.M.G.C. had done recently in France. The photograph depicts a Clyno machine gun battery on the Western Front posing with its souvenirs—German helmets.

MOTOR CYCLIST HONOURED.

MOTOR Cyclist Sgt. C. J. McGowan. R.E. (Kilburn, London, N.W.), has been awarded the D.C.M. for distinguished service in connection with the military operations with the British Forces in Mesopotamia.

AN IRISH DISTINCTION.

CAPT. ERIC MECREDY has been awarded the M.C. and *Croix de Guerre* (with *Palme*) for "commanding a section of tanks with great calmness and skill at an exposed point." He is just twenty-two years of age, and has served since 1914, when he joined the A.S.C., M.T., as a driver. He is the youngest son of Mr. R. J. Mecredy, editor of *Motor News* and *The Irish Cyclist and Motor Cyclist*.

THE A.S.C., M.T., IN PERSIA.

THE following is an extract from a letter written somewhere on the route of the new move across the Persian mountains from Bagdad to the shores of the Caspian Sea. The writer, who was an enthusiastic motor cyclist before the war, had been stationed some hundred miles or so from Bagdad, and speaks of a "flying visit to the City of the Caliphs."

"I was taken from the lorry I had been driving for some time past and put on another just out of the workshop. Two days after I had another hurried trip to Bagdad and back: that was only a week ago. Now I am in a different part of the world—as different as chalk from cheese. It is a delightful change. Just try to imagine being suddenly transferred from the dusty plains of Mesopotamia to a country like North Wales on a grander scale—more rugged and wild.

"It was a stroke of bad luck that I was deputed to tow a disabled Fiat lorry with me. We were both fully loaded. My lorry stuck it well for twenty-seven miles, and managed several very steep hills: but at last the back axle broke with a loud crack. Consequently, we both had to be towed for some miles to the camping place for the night. Next morning we changed the broken axle for a good one taken out of another dud lorry and continued up a pass, the like of which I had never seen. If you could imagine Aberglaslyn Pass, in North Wales, with a much steeper gradient continued for four miles, including three hairpin bends, you will get some idea of the place.

"Even now in June the snow has only just disappeared. I was afraid to stop to use a camera as the chance of getting going again was too risky. We reached the top about 5 p.m., but three of the cars failed to turn up, and we camped for the night. I have just heard that one car had a differential go, so that we shall have to return to give assistance."

The writer has recently met a brother in this wild district whom he had not seen for nearly three years.

THE ADVENTURES OF AN R.A.F. DESPATCH RIDER.

"I HAD had a fortnight's training with a motor car firm, I had never touched a motor bicycle in my life, and when I was given a book and saw that the engine appeared to be made up of a thousand parts I was bewildered. But an hour's talk with an expert made it plain that the whole of them were controlled by about six levers and handles, and when I had mastered these I knew the secrets of a motor bicycle." So began a short article entitled "Despatch Riders," in a recent issue of the *Daily Mail*.

Now, on P. and M. motor bicycles, such as are supplied to the R.A.F., there are the throttle, air, spark, change speed, and exhaust levers, which make a total of five, so what the other one is meant to control, so far as the engine is concerned, we leave it to our readers to guess.

"Soon I was taken out for a trial run. The instructor sat in the sidecar, and started the engine, and as the machine moved off he called to me to spring into the saddle. I fell on the ground, and barked my hands and knees. . . . Shortly afterwards I mastered the trick of leaping into the saddle when the bicycle is in motion."

Now, considering that the P. and M. is started by means of a kick starter (which, as the absolute novice knows, can only be actuated from the ground or from the saddle), it is rather hard to say how the instructor could have started the engine while sitting in the sidecar. Also, with such machines as are supplied to the Army, it is unnecessary to get on with a running mount, as the clutch, or, as in the case of the P. and M., the gear, allows the load to be easily taken up with the driver seated in the saddle, so it seems rather strange that this poor girl should have been put to the trouble of learning a running mount, which resulted in her doing not only injury to her fair self, but, as she explains in her own words, she "ruined her father's cycling breeches."

WHEN A MACHINE BECOMES A HABIT.

TALKING of falling with a machine reminds us of a D.R. in Egypt at the time of the Gallipoli stunt, who rode a very heavy all-chain drive 4 h.p. B.S.A. for several months. Later he was given a 2¾ h.p. Douglas, which was so light that he had three falls the first day before he got used to the balance and "feel" of the machine—and he was no novice either.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

COMPRESSION RELEASE VALVES.

Sir,—*Re* illustration of compression release valve, patent 111,590, 1917. If the patentees will obtain a 1910 Rex catalogue they will see the same idea illustrated on page 23. This was fitted to all Rex two-stroke engines.

The only difference in the two designs seems to be that in the Rex design the valve head could not fall into the cylinder, whereas that contingency is not provided against in the Villiers. H. SARGINSON.

FIXING THE GUDGEON PIN.

Sir,—*Re* discussion on "Fixing the Gudgeon Pin," my experience of the Norton method of fixing the gudgeon pin is that either the key in the gudgeon pin or the keyway in the piston soon wears, thus allowing the gudgeon pin to move in the piston bosses.

In each case I overcame the trouble by fixing a tight-fitting gudgeon pin with a two-thousand taper and the usual key in the end, and had no further trouble.

The method of fixing the gudgeon pin in the connecting rod as illustrated in your description of the Raleigh engine in your issue of June 6th seems to be by far the best method. It has the following advantages:

1. Gudgeon pin is secured by a bolt through the connecting rod, and cannot turn.
2. Fixing bushes in piston bosses does away with any risk of distortion of piston due to tight-fitting gudgeon pin.
3. A larger bearing surface.

Wishing your paper every success in its effort to perfect the motor cycle. F. J. FORD.

IN CLOVER!

Sir,—May I recall a subject that will be forgotten by the majority of your readers. I refer to the assertion made by someone that when passing a field of clover in bloom his engine lost power and became sluggish, but that, when the clover was left behind, it picked up at once. I am now in a position to give a reasonable explanation of this apparently mysterious phenomenon.

Firstly, any motor cyclist knows that on starting out for a ride on a hot dry afternoon, the engine is sluggish and unresponsive, but that, when returning home at night it is like the donkey on the sea shore—it knows its way home, and is full of vim. The explanation of this is that for combustion of any sort water must be present. It is a chemical fact that nothing will burn in a perfectly dry atmosphere. Now, on the hot dry afternoon in question, the amount of water vapour present in the air is below the minimum required for the most powerful combustion or explosion. Hence the sluggishness. At night the dew begins to fall, the required minimum is present, and the engine gets new life.

Now the question arises, what has this to do with a field of clover? Here is the answer. Any farmer will tell you that a crop of hay in which there is a lot of clover is a very wet one. There is little more to be said. The clover plant has a great affinity for water. It sucks up from the atmosphere surrounding it a great deal of water vapour—in fact, it reduces the amount present to below the aforementioned required minimum. Hence the sluggishness noticed by that observant motor cyclist.

I am sorry to be so late with this, but the facts have come to hand one at a time and very slowly. But "better late than never," for the really curious mind will never admit that there is such a thing as a mystery.

To change the subject. I think I am voicing general opinion in saying that anyone who without very good reason averages more than twenty-five miles per hour on a British highway is neither a use nor ornament to an estimable and highly respectable body of martyrs—British motor cyclists. BIG TWIN.

Sheffield.

UNEQUAL COOLING.

Sir,—"Ixion" prefers to cool the back of a cylinder by baffle plates at the side, while "Road Rider" suggests a V shaped streamline fin.

This unequal cooling does exist. In a rotary aero engine it is one of the principal disadvantages, and has to be overcome in devious ways—patent piston rings or iron-lined cylinders.

Every body moving through the air has an area of rarefied air behind it tending to drag it back, and this area increases with the speed. This is not theory but practical fact. The vacuum on the top of a plane contributes three times as much towards lifting an aeroplane as the compressed air underneath.

I want to see a streamlined motor cycle. The front mudguard, the cylinders, and the handle-bars would all have V shaped "fairing" extending behind them, and the rider would sit in front of a sort of candle extinguisher with the point extending back behind the carrier. Everything looks ridiculous at first! Some day we may even admire the R.A.F. uniform. Streamlining the wires alone of an aeroplane means an increase of 6 m.p.h. Has anyone streamlined a motor cycle, and what were the results?

E. P. BURDETT.

THE FIRST SPIRAL NOSE DIVE.

Sir,—"A.R.'s" letter in *The Motor Cycle* for August 29th contains one or two inaccuracies, which I would like to correct. The late Lt. Parke was flying an Avro enclosed biplane at the military trials when he recovered from that historical nose dive which so nearly ended his career.

The Avro enclosed monoplane illustrated in your journal was the forerunner of this machine, and was, I believe, the first flying machine built in which the pilot was totally covered in. This machine which was first flown at Brooklands had a stationary radial engine—a French Vaile. I believe—and, if I am not mistaken, Mr. Roe borrowed this engine to fit in this machine. This shows one what our pioneers had to contend with in those early days, when one had to put up with difficulties of which the modern flying man never dreams. To Lt. Parke the aeroplane industry owes an eternal debt, as he was the first man to do a spiral nose dive and live to tell the tale. Several of the early flying men met with exactly similar circumstances, but, unfortunately, they were all killed by the ensuing "crash." The nose dive was not caused by excessive side area. No doubt "A.R." is confusing this with the fact that all "pusher machines" with deep nacelles were prone to slide slip on the slightest provocation, but in Lt. Park's case he was flying a tractor machine. Incidentally, this machine earned very special praise from the military authorities at the time, and but for the fact that it was under-powered (it only had a 60 h.p. Green engine) it would have most probably come very close up in the list.

After the trials Mr. Raylnam flew the same machine from Upavon, along the South Coast as far as Brighton, and then on to Brooklands without a stop. He afterwards flew nine hours without a stop in an attempt on the duration record, so apparently there was not very much wrong with the machine. I hope these few particulars concerning this pioneer machine will prove to be of interest to your readers.

H. GILBERT.

CYCLE CARS.

Sir,—I have just received *The Motor Cycle* for August 22nd from a friend, and notice that the interest in cycle cars is awakening. It is time it did. And it is also time the British manufacturers woke up to the fact and took the initiative. There is money waiting for the man who is smart enough to take advantage of the situation.

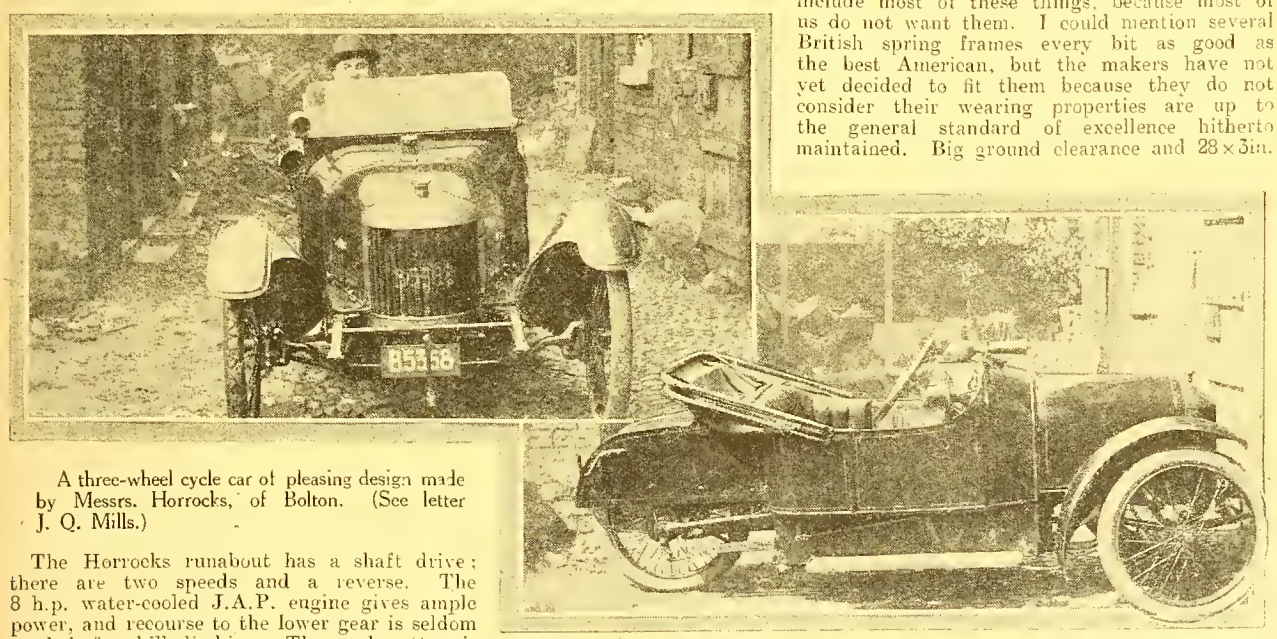
At present the Morgan (G.P. model) is the only one which looks really smart, but it has one great drawback, in my opinion, and that is it has three wheels instead of four. Just imagine the trouble that a "non-technical" man would have in case of a puncture in the back wheel. It would mean a difficult job even to a mechanic (if dressed in good clothes): never mind a man like myself.

Now if we had the Stepney wheel, as on the Singer, it would be no trouble at all. I am about to give a list of the ideas which will be necessary to the perfect cycle car.

(1.) It must have four wheels and a spare one, also the usual method of carrying it. (2.) A good powerful, clean, 8-10 h.p. engine. (3.) Three speeds, with neutral and reverse. (The Morgan, I believe, has no reverse, which is a pity.) (4.) Electric starting. (5.) Slightly bigger body than the Morgan. (6.) A foot accelerator, and such things as a suitable luggage carrier and disc wheels for those who want them.

By the way, when are we to hear about the Norton cycle car? I have an idea that when it does come it will give all others a shaking up. If the runabout is as clean in design as the motor cycle it will be all right. (We must also abolish the Morgan control system; it savours too much of the motor bicycle.) This 'bus, with equipment, should cost no more than £130. SERGEANT MECHANIC, R.A.F.

Sir,—Your correspondent "Rif-raf" pleads for more choice in three-wheelers. It may interest him to have details of my runabout, which was built by Messrs. Horrocks, of Bolton, a photograph of which I enclose.



A three-wheel cycle car of pleasing design made by Messrs. Horrocks, of Bolton. (See letter J. Q. Mills.)

The Horrocks runabout has a shaft drive; there are two speeds and a reverse. The 8 h.p. water-cooled J.A.P. engine gives ample power, and recourse to the lower gear is seldom needed for hill-climbing. The carburetter is a Binks. The outline of the machine follows orthodox car lines more closely than any other three-wheeler I have seen, and is distinctly smart and pleasing.

If your correspondent desires fuller particulars, I shall be happy to furnish them through the post if he will write me.

J. Q. MILLS.

LANDING IN STANDING CORN.

Sir,—May I point out that landings by aeroplanes in standing corn are quite common events, and usually are quite successful?

Whilst in France I remember being lost in a heavy fog, and eventually landing in a wheat field without damage, except to the crop. The wheat was 7ft. 6in. high! Quite recently I witnessed three training machines land in one corn field within an hour, all intact.

To change the subject, we have a grievance which comes within your sphere, and which perhaps may interest you. This is the reluctance of the authorities to grant any facilities for petrol to married officers living out of camp. As the camps are nearly always crowded, the "powers that be" are glad enough to give permission for officers who are married to live out, but forget the difficulty of transport. Many of these officers are instructors, and a four-mile walk or cycle ride in hot or bad weather after a strenuous day is not conducive to efficiency. The trouble lies with the Army authorities, and not with the Petrol Committee, who will always sanction a permit if franked by the Air Ministry, but the red tape is awful, and it is nearly always turned down at The Cecil.

The police could always assert their authority if these permits were abused, as an officer caught on the road anywhere but between his billet and camp would naturally be "strafed." CAPT. R.A.F.

Lincoln.

BRITISH AND AMERICAN MACHINES.

Sir,—I see from your issue of August 8th, just to hand, that the Rev. A. M. Walmsley, of Ceylon, is taking exception to an article I wrote in my giddy youth *re* the above subject. I have already done my best to soothe numerous readers who have written to you or me on this vexed question, but since I always regard the Rev. A. M. Walmsley as one of the No. 9 hats, as "Ixion" would say, I should like to claim still a little more space to reply to his mild diversion

Your correspondent demands, "What Britisher provides spring frame, big ground clearance, 28×3 tyres, mechanical oiling, twist grip control (ye gods!), hand and foot-controlled clutch (tank control, not handle-bar), interlocked with gear shift." (Oh, my aunt!) The British programme does not include most of these things, because most of us do not want them. I could mention several British spring frames every bit as good as the best American, but the makers have not yet decided to fit them because they do not consider their wearing properties are up to the general standard of excellence hitherto maintained. Big ground clearance and 28×3in. tyres are features of many military models—A.J.S., Norton, Sunbeam, New Imperial, etc. Mechanical oiling we find in the 3 h.p. Enfield, and what applies to spring frames applies again here. The other features are purely a matter of taste, but I cannot understand any Colonial who has tried a handle-bar clutch preferring the American system, with its chaos of bell cranks, cantilevers, and overhead hoists!

It is not a matter of "the Britisher modernising his design," it is merely that the American slaps any new idea which appears practical into practice, whereas the British maker, with his long-standing reputation for thoroughness and reliability, will not risk adopting a new idea till he has experimented exhaustively, and very often

his experiments result in his ultimately discarding the idea. This is a point which is not generally realised when motor cyclists glibly enquire, "Why doesn't the British manufacturer do this and that? Is he asleep?"

Mr. Walmsley has evidently not been in England for some time or he would not talk in that light-hearted way about mixing drinks.

I do not recall ever having set out to scold anyone for making unfair comparisons, though, of course, I may have done, and as for gross exaggeration—what would journalism be without it? Mr. Walmsley seems to think I shall be hurt because he has not taken my article seriously—not a bit of it! Our troubles usually arise through people taking us *too* seriously—mine do, at any rate. But it is no exaggeration to state that if I were given the choice of patrolling "No Man's Land" in my stockinged feet and with a lighted candle in my hair or of working in one of the American motor cycle repair depots now being established in France I should choose the former—seriously!

Armée Française. CHINOOK.

ONE-LEVER CARBURETTERS.

Sir,—It is with much interest that I have read the correspondence on one-lever carburetters which has appeared in *The Motor Cycle* from time to time. I may say that a few months ago I came across an old Binks one-lever two-jet, discarded evidently as useless. I attached it to my 3½ h.p. Lincoln-Elk. The result was striking in many respects—*i.e.*, remarkable power and speed, a hot engine, and sixty-five miles to a gallon of petrol. The jet sizes are 6 and 4.

Now, for obvious reasons I removed the float chamber from the off to the near side of the carburetter. I then arranged for extra air to both jets, thereby converting it from a one to a two-lever, utilising a Bowden two-lever control, the gas lever having been arranged to give a lift of 2in., as is necessary for a Binks.

The efficiency of the carburetter has not been upset, but the mileage per gallon of petrol has often exceeded 100. It would no doubt be somewhat difficult to regulate both air and gas independently of each other by a single lever. Yet even this is not outside the range of possibility. It has always been my contention that any engine that will start easily when cold is certainly taking insufficient air when warm when the carburetter is of the single-lever type. For all-round efficiency the two-lever type of carburetter with two or more jets cannot so far be replaced, and we may have to look a long way ahead for the production of a single-lever type which embodies the special features of a well-manipulated two-lever. JAMES REECE.

PETROL FOR DISCHARGED SOLDIERS.

Sir,—As a motor cyclist, I am naturally very interested in any developments in the Petrol Restrictions Act and any concessions made to the favoured few. The present motor 'bus strike has made things look as if they might be made a little more rosy, for, at any rate, Army, Navy, and Air Force men who have given up their all, and especially the young men who are giving up the best years of their life to the Empire's need. The following rough estimate is, I think, absurdly low.

The estimated number of motor 'buses on the road per day is 1,000, average use of petrol per day ten gallons; that equals 10,000 gallons per day and 50,000 gallons for the five days' strike.

Could the Petrol Controller be approached with a view to asking for this concession to be granted to us?

London, N. A PRE-WAR ENTHUSIAST.

Sir,—May I support Mr. J. Cooper's suggestion that endeavours be made to obtain petrol for discharged soldiers? I do not wish to bother you with any sloppy sentiment or absurd heroics. I have done my duty, and got badly crippled in the attempt, and I have to be satisfied with my Blighty, and be thankful it is no worse.

However, sir, I can tell you it is no joke trying to wobble off into the country for a breath of fresh air, and a small supply of petrol, so that I could tootle about a bit on my old puff and dart (pre-war), would be a greater blessing to me than any whole man can understand.

I tried to join the Fuel Union, but could not be accepted, as I am not a munition worker. I have nothing particularly against munition workers—I suppose they are necessary evils, like soldiers, for the time being—but it goes against the grain a bit to learn that strong, sound men can get petrol for holidays and week-ends, while we who have served in the line and got crippled for life are barred.

Now, sir, can you help us? We are the old pre-war sports, and you know what great days we had then.

Sheffield. ONE OF THE OLD 'UNS.

WITH THE AMERICAN ARMY IN FRANCE.

A motor cycle repair shop in a ruined village at the back of the line. Mechanics repairing and adjusting 8 h.p. Indian twins—machines used by American despatch riders.

QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Leave from Ireland.

A friend of mine who is in the Army and is now over in Ireland will shortly be coming home on leave. Could you please tell me whether he could get a small quantity of petrol if he applied to the Petrol Control Committee?—J.G.C.

Petrol is granted to soldiers on leave from Overseas and from hospital only. Consequently we are afraid your friend will not be able to obtain petrol, as Ireland is not Overseas within the meaning of the term in this application.

Questions re an Old Engine.

Would you please let me know the h.p., also revs. of a Minerva motor engine, bore 2 3/4in., stroke 2 1/16in.? Also, where can I get spare parts for this engine, as it requires a new cam, and what kind of magneto would suit this engine?—W.M.

You do not give the age of the engine, or say how the inlet valve is operated. The sizes given are of an engine of approximately 2 h.p. We fear that unless you can pick up the parts you require second-hand, you will not be able to procure them at all. Any single-cylinder type magneto would do.

Machine for Disabled Rider.

I am a disabled officer, having lost my right leg, and I wish to purchase a motor bicycle. The machine I purchase must be able to start with a light kick, as I cannot give a violent kick when standing on my false right leg; neither can I operate a brake or clutch with this false right leg. Would you please inform me if (1.) a lightweight machine with handle-bar-controlled clutch and kick starter would be the most suitable? (2.) Which make of machine would be, in your opinion, the best to purchase?—O.H.

(1.) We think that the best type of machine for you to get would be one equipped with handle starting. Also, judging from the opinions of readers with only one leg, the sidecar machine is much easier to handle than the solo machine. (2.) While we do not recommend any one make in preference to another, we think you will find the Royal Enfield sidecar combination a very suitable machine for your purpose, as the clutch and gear are controlled by the same lever mounted on the tank, and a brake could be easily fitted whichever side would be the more convenient for you. The machine is also handle starting.

Here and There Questions.

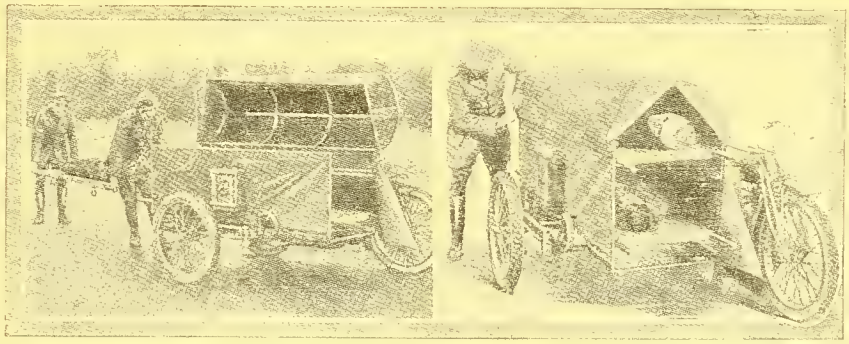
I should be glad if you would answer the following questions relating to a 2½ h.p. two-speed Allon: (1.) On application of the brakes I find that they skid the back wheel, and that the steel band binds on the drum and overheats. How can I avoid this? (2.) If I run fast and meet a slight incline, I find that the 'bus pulls up suddenly, and that the engine smokes and refuses to fire. After a minute's pause it starts off again quite well until it meets the next hill. It is not plug trouble. Is it overheating or temporary seizure or plug points getting hot? (3.) The carburetter is a Senspray, and as I wish to reduce consumption, would decreasing the size of the jet effect this without altering the running of the bicycle? The jet at present is 28. (4.) Do Spots help in reducing the consumption? (5.) Does an extra air inlet between carburetter and inlet port release the crank case compression? (6.) Are you of the opinion that a 292 c.c. two-speed two-stroke Allon is capable of taking a sidecarette? Can you recommend a light sidecar?—B.E.H.

(1.) Obviously the adjustment of your brakes is very much at fault. Relining with some such material as Ferodo might be of considerable benefit. (2.) In spite of your assurance that this is not plug trouble, we are inclined to think that it is. If you experiment with one or two different plugs, obtaining one with short thick electrodes, you will probably find your trouble entirely disappear. The big plug manufacturers have conducted some rather exhaustive experiments on plugs for two-strokes, and if you put your trouble before one of them we have no doubt that he will do his best to help you. Are you sure that your lubrication is working satisfactorily? Any fault in lubrication, especially under-lubrication, may cause the symptoms of which you complain. (3.) The jet you are using is small, and it would not be advisable to reduce it further. (4.) The doping of petrol to reduce consumption has long been proved fallacious. (5.) No. The extra-air valve should be unnecessary with a correct size jet and choke tube. (6.) We do not recommend any sidecar attachment to such a small machine.

Adjusting a Hub Gear.

(1.) What can be the cause of my engine spitting back through the carburetter at slow speeds? I have cleaned the magneto and carburetter and ground in all the valves, and I find that there are no air leaks. (2.) When I take out my clutch (a countershaft three-speed Sturmey-Archer on a 4 h.p. Norton) some of the dogs appear to catch and make a noise. If I only pull it out, say, halfway, it is quite free. I took it all down, and cannot find anything wrong.—S.M.

(1.) The trouble is usually caused by a weak inlet valve spring or by too small a jet. (2.) This is because the gear is not properly in neutral, and the control rod should therefore be adjusted. This is best done by putting the gear in neutral and rotating the back wheel with the clutch in. If any sound is heard, adjust the control rod until the gear is entirely free.



A sidecar ambulance designed to carry two patients. The photograph on the left shows it open, ready to receive the wounded. That on the right depicts the arrangement of protective curtains.

The Way of a Magnet.

(1.) If the magnets on a magneto are set properly, is it right that steel will stick to them from the outside? I notice that is the case with mine, as it attracts a screwdriver very strongly. I was under the impression that the magnet works inside on the parts there, and that it is like any ordinary piece of steel outside. (2.) My machine is a 6 h.p. Enfield. When I start it cold it splutters and misfires greatly for about 200 or 300 yards, but after getting warm it seems to run all right. This has been the case for a very long time, and changing the plugs does not make any difference.—O.I.G.

(1.) No; whatever position the magnets are in, both poles would attract an unmagnetised piece of steel, even from the outside. (2.) This is by no means an uncommon symptom. The best way to get over the difficulty is to let the engine run free for a few minutes until it is warm. Probably the carburetter is getting a little too much air at slow speeds.

Building a Cycle Car.

For some time past I have been considering the construction of a small cycle car; a small four-wheeler on somewhat the same lines as the one illustrated in your issue of July 4th would be suitable. As I am a person of very moderate means, and have only limited workshop accommodation, a small plain lathe and a few odd tools being my sole equipment, would it be too big a job for me to tackle? If not, will you kindly answer the following questions: (1.) Are there any books on the design and construction of small cars (I have read "The Autocar Handbook")? (2.) Where can I get aeroplane wheels or any other suitable wheels? (3.) If I use motor cycle wheels, how shall I arrange the bearings, as they are usually supported on both sides and only on one side on a car? (4.) Can I satisfactorily make a reliable steering gear and front wheel bearings and also spring the frame myself? (5.) Will an 8 h.p. J.A.P. engine be suitable (I want a speedy machine with plenty of reserve power)? (6.) Air or water-cooled? (7.) What will be the approximate cost of such an outfit?—W.H.L.

If you have not ample equipment, and also a fair amount of experience, we do not think you will be well advised in attempting the construction of a cycle car. However, we give you the answers to your questions. (1.) "The Light Car Handbook" deals exclusively with small cars. This may be obtained from the above address, price 1s. 9d. post free. (2.) We regret we cannot tell you where you can get any parts at the present time. We would suggest that you follow the small advertisement columns of *The Autocar* and *The Motor Cycle*. It is practically impossible to obtain parts direct from the makers under present conditions. (3.) There will be no need to use motor cycle wheels; sidecar wheels would suit quite well. (4.) This, as already suggested, depends entirely on your abilities and experience. Unless you are fairly intimately conversant with the strain and stresses to which these components are subjected, we should advise you to buy them complete. (5.) The question of engine power depends entirely on the weight of the complete car both laden and unladen, but you give no suggestion what this may be. Up to 10 cwt. the engine you suggest should be satisfactory. (6.) Water-cooling is certainly better, but involves extra complications in manufacture. The advantages gained may not be worth this extra trouble in design. (7.) It is absolutely impossible to give an idea with any degree of accuracy. It is quite conceivable that the cost may be anywhere between £50 and £100.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Surveyor Wants Petrol.

I am taking on extra mileage in connection with my work, owing to the long illness of a brother surveyor in an adjoining district, and it will be impossible for me to undertake the work unless I am able to obtain a motor cycle and petrol. I have already obtained the necessary form from the Priority Department, Ministry of Munitions, and Petrol Control, and Road Board, but the question of taking on this extra work has been adjourned for one month. At present I have a mileage of three hundred, and with the additional it will be, roughly, 650 miles. What are my chances of obtaining the petrol (for about forty miles average per day at least), and also for obtaining a priority certificate for a new machine? Can you also give me any advice as to the best machine for this class of work? The district is hilly and rough.—B.W.

The obtaining of the forms does not really mean much. What you want to get is the necessary priority certificate for the purchase of the machine. Then you may set to work to get your petrol by placing full details of your case before the Petrol Controller, 19, Berkeley Street, London, W.1, and mentioning that you have succeeded in getting a Class A certificate. If you cannot get a Class A certificate, it is rather improbable that you will be able to get the petrol, although not necessarily so. Also get a certificate from your Rural District Council stating that your work is of national importance. Then you ought to be able to get the petrol. As regards the selection of a machine, this depends to a very large extent on choice, but we do not think you can do better than obtain a 4 h.p., single-cylinder, three-speed, all-chain drive machine. A motor cycle of this type would take you absolutely anywhere under any conditions.

Tyre and Rim Sizes.

Would a 26in. × 2½in. cover be suitable for a rim made to take a 650 mm. × 65 mm. cover? I purchased a wheel fitted with an old 26in. × 2¼in. cover, and bought a new 26in. × 2½in., but this does not seem to be a good fit at the bead.—G.J.J.

The 650 mm. × 65 mm. rim is intended for light car tyres; consequently a 26in. × 2½in. motor cycle cover would not fit, being smaller across the bead.

Difficult Starting.

I have a 1914 7.9 h.p. Indian, which I have cleaned and overhauled during the winter, and find that I cannot get the engine to start, either on the stand or on the road. I think the trouble is due to the spark from the magneto being too weak. I have done all you advise in a recent issue of *The Motor Cycle*, and can only get a very small spark. Would you tell me the best way to time the magneto for this make of machine? Since buying the machine I have never been able to use both gears. If I adjust the controls for top gear it will on no account stay in low; it slips with a grating sound. If I adjust for low gear when putting it into top gear it will not stop in. I have adjusted the controls when in free position in every conceivable manner, but with no result. Can there be anything wrong with the control fork in the gear box?—W.H.O.

The difficulty in starting is rather hard to understand. Of course, it may not be due to the magneto at all, but to air leakage at the carburetter or induction pipe unions. When tested the magneto gives a fairly small spark because it cannot be rotated sufficiently fast. The magneto should be timed in the following manner: Place the piston exactly on top of the compression stroke and connect up the magneto with the points just about to break and the ignition lever two-thirds retarded. The trouble you are having with your gear box is probably due to loss of movement in the gear operating rod and levers caused by wear, and to overcome this trouble you will have to file a fresh set of slots in the gear quadrant so that the gears engage properly.

RECOMMENDED ROUTES.

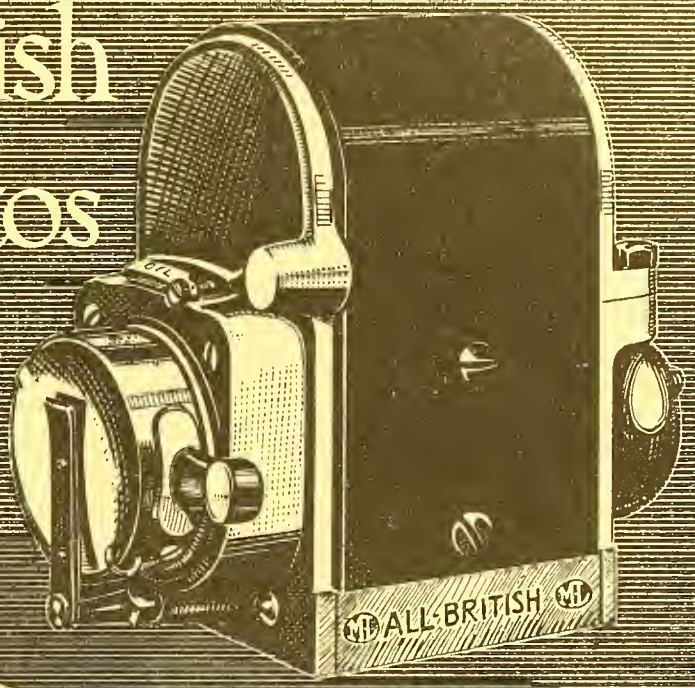
DOVER TO PORTSMOUTH.—A.F.S.

Go along the coast from Dover through Folkestone, Hythe, New Romney, Rye, Winchelsea, Hastings, St. Leonards, Bexhill, Pevensey, Polegate, Lewes, Brighton, by the old road to Shoreham, Broadwater, Arundel, Chichester, Havant, Cosham, Portsmouth.

NEWPORT (MON.) TO DUNMORE.—C.K.W.

Newport, Usk, Raglan, Monmouth, Hereford, Leominster, Ludlow, Church Stretton, Shrewsbury, Whitchurch, Tarporley, Warrington, Wigan, Preston, Garstang, Lancaster, Kendal, Penrith, Carlisle, Gretna Green, Ecclefechan, Lockerbie, Beattock, Crawford, Abington, Roberton, Lanark, Carluke, Newmains, Airdrie, Cumbernauld, Larbert, whence you should enquire the best way to Dunmore.

All British Magnetos



M-L

THE main features of "M-L" All-British Magnetos are more spark energy and sparks at much lower speeds, great reduction in size and weight as compared with similar pre-war magnetos, and strict interchangeability of parts—permitting prompt supply of spares.

The ever-increasing production of the All-British "M-L" Magnetos proves perfect reliability and complete satisfaction to their users under severest possible conditions. Experience tells.

THE M-L MAGNETO SYND. LTD.,
COVENTRY.

BRITISH IGNITION APPARATUS ASSOCIATION

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

ABINGDON, 3½h.p., fast and reliable solo machine; £23/15; E.P. or exchange.—Service Co., 292, High Holborn, London. [7909

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

2¾h.p. A.J.S., 3-speed, fully equipped, like new; £46/10.—15, Rustic Av., Streatham, S.W.16. [7642

A.J.S. 1914 6h.p. Sidecar Combination, beautiful running order; £55.—168, Archway Rd., Highgate, N. [7837

A.J.S.—Immediate delivery from stock, 6h.p. combination, also two 6h.p. solo.—Parker's, Bradshawgate, Bolton. [X7592

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [4987

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

3½h.p. Ariel Combination, complete, 5 gn. Jones speedometer and watch, grand condition; 40 gns.—Roots, 5, Rheidol Cottages, St. Mary Cray, Kent. [7809

Bat.

1914 Bat Combination, 6h.p., 3-speed, splendid order; £50.—Ross, 86, High Rd., Lee. [7785

For New Machines

(Solo and Combinations)

AND FOR

Second-hand Machines

OF

AscertainedValue

THE SURE FIRM IS

GODFREY'S

By ascertained value we mean an intimate knowledge of the state of every working part by actual examination.

The external appearance of a machine you can judge yourself. But it is far from being a reliable guide to value.

Write for full list of our stock of New and Second-hand Machines.

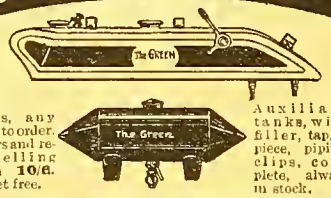
EXCHANGES. EASY TERMS.

GODFREY'S LTD.

208, Gt. Portland Street, LONDON, W.1.

'PHONE: 7091 MAYFAIR (2 Lines).

Petrol & Oil Tanks



Tanks, any shape, to order. Repairs and re-enamelling from **10/6.** Booklet free.

Auxiliary tanks, with filler, tap, T piece, piping, clips, complete, always in stock.

A. GREEN, Water St., Blackfriars, Manchester.

Patterns and self measurement form free.

This Book should be read by every Motor Cyclist.

Send for it!

IRVINE SMITH, BUTTERSHAW, BRADFORD.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Bradbury.

4h.p. Bradbury Combination, overhauled, perfect; £ or exchange with cash for higher power.—Dav Wendros, Boncath, Pem. [X76

Brough.

BROUGH, 3½h.p., 1916, 3-speed countershaft, ki starter, speedometer, horn; £60; E.P. or change.—Service Co., 292, High Holborn, W.C.1. [78

B.S.A.

B.S.A., 1914 Model K., 3-speed, kick starter, basi sidecar; £30.—H.F., 4, High St., Gillingham, Ke [78

B.S.A. Model K., 4¼h.p., 3-speed, and Millford si car, new outfit; 90 gns.—Colmore Depot, Deansga Manchester. [77

1917 B.S.A., 4¼h.p., 3-speed, chain-cum-belt dri complete with Montgomery sidecar, perfect co dition; £70, or near cash offer.—Charles Coales, Ne port Pagnell. [X76

1917 B.S.A., 4¼h.p., Phœnix C.B. sidecar, 3 lamp Klaxon horn, Stewart speedometer, 2 spa covers and belt, all in splendid condition; £68/10.—2 St. John's Rd., Putney. [78

4¼h.p. B.S.A. Combination, July, 1916, chain-cu belt, 3-speed countershaft, accumulator, electr lamps, 3,000 miles; £58, or offer.—Cooper, Newsagen Sparkenhoe St., Leicester. [X75

1917 B.S.A., 3½h.p., T.T. Model D., new, new used, several spares and fittings, including ne tyres; what offers? Seen by appointment.—21, Fleetwoo Rd., Dollis Hill, London, N.W.10. [785

B.S.A. Combination, 1915, in new condition; th machine has been left in my charge, and must b sold; can be seen here; price £50.—Apply to Sergean Major Callander, Military Hospital, Ducane Rd., She herd's Bush, W.12. [784

Calthorpe.

CALTHORPE-J.A.P., 1916, 2¼h.p., 2-speed, clutch £25.—Seen at 11, Hammersmith Rd., West Ken sington. [X756

CALTHORPE-J.A.P., 1916, 2¾h.p., Enfield gear, a accessories, suit munition worker.—Peers, 18 Lothair Rd., Harringay, London, N. [786

CALTHORPE Motor Cycles.—All models in stock fo immediate delivery; trade supplied; no permits re quired.—P. J. Evans, 91, John Bright St., Birmingham [095

Campion.

1916 Campion-Jap, 2¾h.p., 2-speed; bargain, £24.— 86, High Rd., Lee. [776

6-8h.p. Campion-Jap, Premier sidecar, Roc 2-speed and free engine, Jones speedometer, tyre and bel new, lamps, etc., in perfect order; exchange single, light weight, or cash; what offers?—Lieut. Samuel, Consti tutional Club, Leicester. [781

Chater-Lea.

1915 Chater-Lea Combination, 7-9h.p., nice order; £55.—36, High Rd., Lee. [776

1914 8h.p. Combination, Chater-Lea throughout, re cently overhauled and re-enamelled, special up holstered sidecar, all accessories; £60; solo machine considered part exchange.—51, Kendall Rd., Clock House, Beckenham, Kent. [782

Clyno.

CLYNO, 1916, 2¾h.p., 2-stroke, 2-speed, clutch, just overhauled, perfect, good Dunlops, 2 belts, lamps, etc.; ready for road; bargain, 28 gns.—F. Horsley, 9 Hawkins Rd., Bedford. [783

MOTOR CYCLES FOR SALE.

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; E.P. or exchange. Service Co., 292, High Holborn, London. [7910

Douglas.

1915 Douglas, 2¾h.p., 2-speed, special model; £42.—86, High Rd., Lee. [7802

DOUGLAS 2¾h.p., 2-speed, clutch, kick starter; £30.—Axis, 9, Regent St., London. [7750

DOUGLAS.—Prompt delivery to those on work of National importance.—Gibb, Gloucester. [4749

1911 Douglas, single speed, thoroughly overhauled; £14.—Box L7,006, c/o *The Motor Cycle*. [7773

DOUGLAS, 2¾h.p., 2-speed, new tyres and belt, in perfect order; £23.—32, Canterbury Rd., Brixton. [7832

DOUGLAS, 2¾h.p., 2-speed, Bosch, good condition; £14; 1911-12.—38, Carisbrooke Rd., Walthamstow, E.17. [7819

TWO Douglas's, 1911 and 1912, both ready for the road; £29/10 the pair.—81, Earlesmere Av., Balby, Doncaster. [X7550

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Keovil. Tel.: 50. [5855

DOUGLAS, 1914, 2-speed, complete with lamps and horn; £35; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [7905

DOUGLAS, 2¾h.p., Nov., 1915, Model W., Amac; £42, cost £58; little used.—Goodey, Brightview, Radley Rd., New Barnet. [7891

DOUGLAS, 1915, 2¾h.p., 2-speed, W.D. Model, quite equal to new, mileage 300; £50.—Write Feather, 26, High St., Wandsworth, S.W.18. [7844

DOUGLAS Motor Cycles.—We can supply by return 1918 models on receipt of permit.—Eli Clark, the Douglas agent, 196, Cheltenham Rd., Bristol. [0923

DOUGLAS 1914 T.T., Bosch, Binks, Dunlops; excellent condition throughout, small mileage; £35.—Trideaux, 8, Ashley Park, St. Andrew's, Bristol. [X7584

1914 2¾h.p. Douglas, 2-speed, clutch model, all accessories, and perfect mechanically, £8 just spent on engine renewals; £35.—Letters to Oakleigh, High Park Rd., Farnham. [7733

DOUGLAS, 1915, 2¾h.p. W.D., 2-speed, F.E., gear box, horn, Lucas lighting set, and tew tools; can be rode away on deposit system; no used for 1½ years; to dealers; best offer £45, absolute bargain.—Burges, 30, Corporation St., Stafford. [X7607

NEW Douglas Motor Bicycles.—The latest 2¾h.p. models for instant delivery for those engaged on work of National importance against permits. How and where to obtain them, fullest particulars and prices, apply to Robinson's Garage, Green St., Cambridge. [7876

1918 4h.p. Douglas Combination, chain drive, one-lever carburetter, interchangeable wheels, the best in every respect, with special coach sidecar, hood, screen, and spring wheel, 3 lamp sets, Cowey speedometer, horn, in perfect condition, driven a few miles only for demonstration purposes.—Prices and particulars, Robinson's Garage, Green St., Cambridge. [7877

Enfield.

ENFIELD Combination, 6h.p., hood, wind screen, equal to new; £75.—J. Rock, Wollascote, Lye, Stourbridge. [X7562

1917 (July) 3h.p. Enfield, as new, only ridden 100 miles; £60, a great bargain.—Wallis, High St., Saffron Walden. [X7616

ENFIELD 2¾h.p. Twin, paid £14 overhauling May, new oversize tyres fitted July; £30 for speedy sale.—James, Halys, Bangor, Wales. [X7545

1917 Enfield Combination, 6h.p. Colonial model, lamps, horn, speedometer; £90.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

3h.p. Enfield, 1912, chain drive, £19; also 4h.p. Bradbury, 1911, £15; both excellent machines, recently overhauled.—Neville, 7, Fitzwilliam Av., Richmond, Surrey. [X7603

ENFIELD, 1914, 6h.p., 2-seater sidecar, £60; 1915 6h.p. combination, £70; ditto, £72; 1916 8h.p. combination, 2-seater sidecar, £82.—Maudes', 100, Gt. Portland St., London, W.1. [7881

ENFIELD 3h.p., mileage about 2,300, complete with Stewart speedometer, Miller 50/- head lamp, rear light, horn, and tools, in splendid condition; £40.—1, Clarence Crescent, Whitley Bay. [X7605

1917 6h.p. Royal Enfield Combination, done 1,600 miles, equipped with Cowey speedometer, Lucas electric lighting set, horn, tools, hood and screen, perfect condition; £100.—J. B. Harrison, Adbaston, Newport, Salop. [X7597

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MATCHLESS 1914 Combination, 8h.p. J.A.P. engine; £75; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [7904

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ALL the above motor cycles are ready for immediate delivery, and deferred payments can be arranged for any of them.—Write for further particulars and list B. 22 to the Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. Telephone No.: East Ham 490 P.A.: Egaraco, London. [7898

MOTOR Agents.—I have in stock for immediate delivery new motor cycles: Rover, New Imperial, Calthorpe, James, Connaught, and Hockley. No permits required. Let me quote.—P. J. Evans, 91, John Bright St., Birmingham. [0957

BRAND New Motor Cycles to clear cheap: Enfield 2¼h.p., 2-speed; New Imperial-Jap, 2½h.p., 2-speed; Royal Ruby, 2¾h.p., 2-speed; 1917 3h.p. 2-speed Enfield, equal to new, £44; Douglas, 2¾h.p., 2-speed, clutch, and kick starter, as new, £38; Enfield combination, 8h.p., fit with lamps, horn, speedometer, guaranteed equal to new, £79; Indian, 5h.p., 3-speed, and coachbuilt sidecar, £63; we have several second-hand motors from £20, guaranteed; all second-hand motors are fitted complete.—Hebden's, Motor Depot, 149, St. James's St., Burnley. Tel.: 488. [7911

King Dick

THE Best spanners ever made are the "King Dick" Spanners. They have been "The Best" for 35 years. Guaranteed for ever. . . .

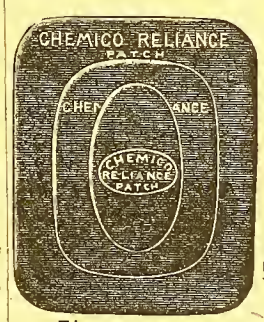
¶ Four sizes—3in., 4in., 6in., and 9in.

Abingdon Ecco., Ltd., Tyseley, Birmingham.

Orders dealt with as Government requirements permit

London: G. H. Smith, 12, Mortimer St. W.1

Godbolds



WHICH PATCH IS THE BEST PATCH?

To arrive at an answer you would of course consider material, workmanship, finish, etc., but would you also take into account **THAT KNOWLEDGE AND EXPERIENCE** which can come only of close touch with rubber and rubber possibilities, and which again ensure the other essentials?

The **KNOWING HOW** is the secret of the best patch, and you will find it splendidly embodied in the

"CHEMICO"

The County Chemical Co., Ltd., Chemico Works, Birmingham.

MOTOR CYCLES FOR SALE.

Miscellaneous.

REMEMBER! Remember!!—Yes, you will remember the firm that sells you a dud motor cycle, and also the date of machine misrepresented, and you have no claim upon them because you have not got the date of machine upon your receipt. Buy of a firm of repute, and you will get the date written upon your receipt for a machine without asking.—Jones' Garage, address below.

JONES' Garage.—1915 B.S.A. Model K, combination, brand new tyres, sidecar in splendid condition, enamelling and plating top hole, perfect, reliable machine; bargain, price £56; date guaranteed accurate.—Broadway, Muswell Hill.

JONES' Garage.—1916 Enfield 6h.p. combination, 650 × 65 Palmer tyres, lamps, speedometer, sidecar screen, not scratched, splendid machine, perfect order and condition, date guaranteed accurate; £72/10.—Broadway, Muswell Hill.

JONES' Garage.—1915 3-speed 7h.p. Indian, in the pink of condition, like new, guaranteed perfect, date guaranteed accurate; £55.—Broadway, Muswell Hill.

JONES' Garage.—1914 2-speed Indian, very good condition, sound, reliable machine; bargain, price £42, or with Millford cane sidecar £50; date guaranteed accurate.—Broadway, Muswell Hill.

JONES' Garage.—1915 Levis, new tyres, disc wheels, T.T. bars, Klaxon horn, P. and H. lamp, thorough mechanical order, date guaranteed accurate; £21.—Broadway, Muswell Hill.

JONES' Garage.—1914 New Imperial-Jap, 2-speed, lamps, horn, new tyres, enamelling and plating very good, engine perfect, not done 500 miles; a sound proposition; date guaranteed accurate; £28.—Broadway, Muswell Hill.

JONES' Garage.—1914 3½h.p. New Hudson and sidecar, 3-speed gear, just overhauled, Dunlop tyres, enamelling and plating good, all perfect; a snip, £26; early 1914, about February.—Broadway, Muswell Hill.

JONES' Garage.—1913 Rover, 3-speed Sturmey-Archer gear, in splendid condition, tyres perfect, enamelling and plating good, sound machine, date guaranteed accurate; £30.—Broadway, Muswell Hill.

JONES' Garage.—1914 T.T. Rudge, 3½h.p., been little used, enamelling and plating and tyres A1; real bargain (date guaranteed accurate), £27/10.—Broadway, Muswell Hill.

JONES' Garage.—1915 Zenith and sidecar, not used since 1916, real good machine; bargain, £62.—Broadway, Muswell Hill.

JONES' Garage.—1913 6h.p. Rex combination, 2-speed, perfect condition, enamelling and plating as new, tyres perfect, engine ditto, not used since January, 1915; bargain, £44; date guaranteed accurate.—Broadway, Muswell Hill.

JONES' Garage.—3½h.p. Brown and sidecar, 2-speed N.S.U. gear, good serviceable condition, good running order, date about 1913; £15/10.—Broadway, Muswell Hill.

JONES' Garage.—1916 8h.p. Reading-Standard, 3-speed, kick start, large head lamp, Lucas horn, all tools, spares, spare tube, all in excellent condition, only done about 1,000 miles, enamelling and plating perfect, splendid sidecar machine, property of naval officer; £65.—Broadway, Muswell Hill.

JONES' Garage.—1916 Crescent 2-stroke, Villiers engine, in perfect condition, new Dunlop tyres; £26.—Jones' Garages, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7827

SPECIAL Bargains.—2½h.p. Calthorpe-Jap, 1915, Enfield gear, £25/5; 7-9h.p. Indian, 1914, 2-speed, and sidecar, £30/5; 2h.p. N.S.U. lightweight, 2-speed, £10; 1913 P. and M., £29/15; 3½h.p. 1913 Humber, 2 speeds, £25/5; 1916 Allon, 2 speeds, clutch, £35/10; 6h.p. 1913 Rudge, Multi gear, big single, £29/15; 4h.p. 1911 Bradbury combination, £18/15; 6h.p. 1909 Rex, £11/15; 3½h.p. 1910 Rex, low riding position, £11/15; 3½h.p. 1911 Humber, 2 speeds, £18/15; 2¾h.p. 1916 T.D.C., £15/15; 2¾h.p. 1915 Douglas, 2 speeds, £32/15; send stamp for detailed list.—Booths Motories, Portland Place, Halifax. Tel.: 1062. [7822

WANDSWORTH Motor Exchange.—Great bargains in real good motor cycles. Only few left. New Rudge Multi, 48 gns.; nearly new F.N., 55 gns.; 1916 Levis, 25 gns.; 1916 Indian, 50 gns.; 1915 Indian, 46 gns.; 1915 Rover, 35 gns.; 1915 Douglas, 45 gns.; nearly new T.T. Triumph, 25 gns.; 1915 New Hudson combination, 46 gns.; Edmund combination, offers; nearly new Humber combination, 38 gns.; Lea-Francis combination, 35 gns.; Clyno combination, 42 gns.; Brown twin, 18 gns.; Ixion, 19 gns.; Wanderer twin, 13 gns.; Bradbury, 15 gns.; Humber, 10 gns.; new Phœnix sidecar, 12 gns.; exchanges and easy terms arranged.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [7848

RIDER TROWARD and Co. offer the following machines for low cash or exchange figures, fullest details and list free: Allon, American Excelsior, Ariel, Bat-Japs (2), Bradburys (5), B.S.A.'s (2), British Excelsior, Connaught, Coventry Eagle, Campion, Calthorpes (7), Douglas (9), Enfields (2), F.N.'s (2), Grandex-Hobart, Humbers (3), Harley, Harris-Peugeot, Indians (10), James (3), J.H., Kerry-Abingdons (3), Lincoln-Elks (2), Levis, Matchless (2), Minerva, Metro, Motosacoche, N.S.U., New Imperials (2), Nut-Jap, New Hudsons (3), O.K.-Jap, O.K.-Precision, P. and M., Premiers (10), Precision, Quadrants (2), Rovers (2), Rex (4), Rudges (14), Sun-Villiers (3), Sheffield Minor, Singers (2), Scotts (3), Sunbeam, T.D.C., Triumphs (12), Veloce, Velocette, Wolf, Williamson, Whiting, Wooler, and Zeniths (15).—31, 40b, and 78, High St., Hampstead. [7731

MOTOR CYCLES FOR SALE.

Miscellaneous.

£10 to £20 purchases any of the undermentioned machines, all of which are guaranteed in running order: Minerva, 3½h.p., 9 gns.; Bat-Jap, 3½h.p., 2-speed, 13 gns.; Bat-Jap, 5-6h.p., 2-speed, 14 gns.; Douglas, 1911, 12 gns.; F.N., 4-cyl., 13 gns.; Triumph, 1911, 3½h.p., 13 gns.; Bradbury, 1912, 3½h.p., 2-speed, clutch, 19 gns.; Calthorpe, 1916, 2-stroke, single speed, 18 gns.; Connaught, 2-stroke, 17 gns.; Douglas, 1911, 2-speed, 17 gns.; Grandex-Precision, 1913, 3½ h.p., 2-speed, clutch, 19 gns.; Lincoln Elk, 1913, 3½h.p., variable gear, waterproof Bosch, 19 gns.; Rex, 1912, 6h.p., 2-speed, clutch, 19 gns.; Sun-Villiers, 2-stroke, 17 gns.; Singer, 1914, 2½h.p., T.T., clutch, 18 gns.; Humber, 1914, 2½h.p., lightweight, 16 gns.; Triumph, 1911, 3½h.p., 2-speed, clutch, 17 gns.; Wolf, 1915, single-speed 2-stroke, 19 gns. Full details on request.—Rider Froward and Co., 31, High St., Hampstead. [7732

TRAILERS.

LUGGAGE Trailers!—Several patterns from stock, others to order. Please call.—Trailer Manufacturing Co., 65, Rosendale Rd., West Norwood. [7880

SIDECAR ATTACHMENTS.

COACHBUILT Sidecar; cheap, £3/5.—1, Osterley St., St. Thomas, Swansea. [X7559

COACHBUILT Sidecar for sale, first reasonable offer. —46, Dale St., Walsall. [X7571

FARLOW Sidecars.—Great stock-taking sale; shop-soiled models at big reductions.—Below.

SHOP-SOILED Sidecar Chassis, 20 only, complete with tyre and quick detachable joints; £4/4 each; cannot repeat.—Below.

SIDECAR Stands, kick-up model, 3/6; sidecar quick detachable joints, 1/6; sidecar mudguard blades, enamelled black, 2/-.—Farrar's Motories, Hopwood Lane, Halifax. [7349

SWAN De Luxe, coachbuilt, 2½ tyre, 4-point attachment; £5.—Harrison, 3, Broad St., Syston, Leicestershire. [X7582

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good stock of second-hand sidecars at moderate prices. [7628

SCOTT Sidecar, off 1914 Scott, £8, no offers; seen appointment only; deposit system if carriage paid. —12, Alan Rd., Wimbledon. [X7613

RENNOC Sidecars are manufactured at the Rennoc Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4.

RENNOC Sidecars are designed and manufactured under the personal supervision of Mr. George Conner, 14 years manager to the Phœnix Sidecar Co.

RENNOC Sidecars.—We supply lugs, rims, spokes, upholstering material, tubing, springs, and all fitments for any make sidecar.

RENNOC Sidecar Bodies, hoods, screens, wheel discs, etc.; actual manufacturers, wholesale, retail, and export.

RENNOC Sidecars.—We specialise in frame repairs to motor cycle and sidecars, enamelling and plating.

RENNOC Sidecars.—Special department for sidecar body repairs, repainting, upholstering, lining, etc. Get into communication with our Mr. Conner. It will pay you. [7436

SIDECARS.—New Swan torpedo, £25; new James canoelet, £18/18; or by extended payments.—Service Co., 292, High Holborn, W.C.1. [7431

CORONET Sidecars, to fit any make of machine; a few shop-soiled models to be sold at special prices Stamp for list.—Booths Motories, Halifax. [7823

NEW Underslung Chassis, £3/10/6; good cane sidecar, closed type, £2/15/6; new light coach sidecar, £7/19/6; front detachable joints, 1/9; T, elbow, and clip lugs, 5d.; large quantity steel tubing; ordinary pattern sidecar springs, 7/6 pair. —Above.

BASTONE'S for Sidecars and Bodies.—Various models in stock; inspection invited; right prices. -228, Pentonville Rd., King's Cross, London, N.1. Tel.: 2481 North. [7406

HOODS, WIND SCREENS, ETC.

RENNOC Motor Sidecar and Engineering Works certainly lead in price, quality, and design of hoods, screens, aprons, etc.—86, Victoria Rd., Stroud Green, London, N.4. [7434

WIND Screens.—The Standard, 27/6; folding top, 32/6; double side wing screen, 45/-; the Fitall, 28/6; the fixed, 19/6; the Orto, 33/-, 55/-, and 60/-; Bluemels, 42/-; the Walbro, 36/-; fawn waterproof hoods, with strong wood frames and plated fittings, 37/6, 42/6, and 57/6.—Juno Showrooms, 248, Bishopsgate, London. [6896

BODIES.

SMALL 2-seater Body, suitable 6-8h.p. engine.—8, Victoria Villas, Upperthorpe, Sheffield. [X7548

CANE Sidecar Bodies.—Several to clear at 50/- each, worth £5. Write for design.—The Willowbrook Co., Leicester. [0901

RENNOC Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4, are actual Manufacturers, also have few clearance and second-hand. [7433

THIS WEEK'S BARGAIN.

1918 W.O. ROVER, with 5-6 h.p. J.A.P. engine, clutch, 3-speed gear, kick-starter, and Sidecar. Cash price, £124 5s.

Also the following NEW Machines, latest models, in stock, all of which can be supplied without permits.

NEW IMPERIAL-J.A.P.,
2½ h.p., 2-speed ..... 44 gns.
LEVIS, 2½ h.p., 2-speed.... £47 10
LEVIS, 2½ h.p., single-speed 37 gns.
***LEVIS** Popular, 2-stroke .. £32 0
ROVER, 3-speed, 3½ h.p. .. £80 0
ROVER, 3½ h.p., T.T., Philipson pulley £67 10

* Permit required for this machine.

SECOND-HAND.
1917 **NEW IMPERIAL-J.A.P.,** 2½ h.p., 2-speed.. 35 gns.
1916 **ENFIELD,** 3 h.p., 2-sp. 42 gns.
BRADBURY, variable gear ..... 12 gns.
O.K. £10 0

JULIAN
84, Broad Street, READING.

Biggest Light Car and Motor Cycle Dealer in the South.
'Phone: 1024. Closed Wednesdays 1.

BODIES.

BASTONE'S for Sidecar Bodies.—Various models, also sporting and tandem bodies in stock; inspection invited; all at low prices.—228, Pentonville Rd., King's Cross, London, N.1. Tel.: 2481 North. [7405

SIDECAR Body Designs for the trade only. Working, coloured, pencil, or line drawings of original designs, also working drawings full sized or to scale.—Cooper's Vehicle Journal, Ltd., established designers to the coach trade for over 80 years. Consult us when designing new ideas.—20, Tudor St., London, E.C.4. [0818

RUNABOUTS AND CYCLE CARS.

8h.p. Morgan-Jap, sporting, late 1915; owner having joined H.M.F.; no reasonable offer refused.—Apply, 10, Carrington St., Barnsley, Yorkshire. [7807

MORGAN, 8h.p. J.A.P., complete with hood, screen, and all lamps, speedometer, etc., in almost new condition; £98.—Hopkins, New St., Ledbury. [X7262

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good stock of cycle cars, including Cardens, Morgans, Chater-Lea, G.W.K., etc. [7629

COLMORE Depot have several very good air-cooled sporting Morgans, from £80 upwards; and also one extremely fine Grand Prix at £135.—49, John Bright St., Birmingham. [7806

MORGAN, 1914, 8-10h.p. J.A.P., Binks, U.H., wind screen, hood, speedometer, 2 lighting sets, tyres excellent; £70.—Write or call after 6 p.m., at 103, King's Rd., Peckham, S.E. [7761

MORGAN, sporting red, disc wheels, hood, screen, Jones speedometer, Binks, J.A.P., lamps, tyres as new; £75.—Mr. Carter, Lacy's Garage, Eccleston Place, Elizabeth St., Victoria, S.W. [X7424

MORGAN, 1917 De Luxe model, complete with hood, screen, C.A.V. dynamo, electric lighting outfit and 5 lamps, absolutely new condition throughout; £150.—Hopkins, New St., Ledbury. [X7261

L.M. Sporting Cycle Car, 2-seater, 8-10h.p. J.A.P., twin engine, 2 speeds, Bosch mag., hood and screen, speedometer, average 50 m.p.g.; 60 gns.—Arncliffe, Armthorpe Lane, Doncaster. [7653

G.P. Morgan, 1916, w.c. J.A.P., hood, screen, discs, oversize tyres, 6 brass lamps (electric and acetylene), perfect order, little used; £125, or nearest.—Spencer, New House, Ashley Rd., Walton-on-Thames. [7864

CARS FOR SALE.

WE have the following cars for sale for cash, extended payments, or your motor cycle in exchange; Enfield, Alldays, R.M.C., Humberette, Horstmann.—Full particulars on application.—Service Co., 292, High Holborn, London. [7416

CARS FOR SALE.

1914 Humberette, 2-seater, 8-10h.p., 3 speeds a reverse, hood and screen, lamps, tools; barga £75, or exchange combination, cash.—24, Granard R Wandsworth Common, S.W.12. [78

6h.p. Rover, in good running order, up-to-date bo high side doors, 2 ignitions, for sale cheap; al back and front axle with wheels.—Barnsley Motor G age, 390, Lichfield Rd., Birmingham. [78

BEDFORD-BUICK, 4-5-seater, flush-sided torpe 15-18h.p., 4-cyl., enclosed Bosch, gate chang any trial; gift, 69 gns.; exchange combination.—Wan worth Motor Exchange, Ebner St., Wandsworth Tow Station). [78

1914 Humber, torpedo 2-seater, 8-10h.p. twin, Bos mag., 3 speeds, reverse, hood, screen, speedomet mechanical horn, lamps, first-class condition, guarant 50 m.p.g.; any trial; bargain, 75 gns.; wanted, go combination; cash either way.—Stiles, 68, Elmsle Rd., Wandsworth, S.W. [78

WHY Pay Luxury Tax?—Buy immediately. If y won't buy at the following prices I'm shuttin up shop! Remember all dates quoted here guarante accurate. 16-20h.p. N.A.G. chassis, gate, S.U., Bosc 815 tyres, £25; 1-ton chain-driven van, £35; 12h. 1914 Buckingham cycle car, streamline 3-seater, a aluminium, £50; 8-10h.p. Unique parcels lorry, t lieved latest type, pointed radiator, 4 wheels, wate tight mag., £50; 15-20h.p. K.R.I.T. torpedo, mon bloc, gate, Bosch, Claudel, £65; 14-16h.p. Belsize 1 cwt. van, £65; 20h.p. 6-cyl. Standard semi-sportin 4-seater, later model, with high engine, worth treb £75; 15h.p. Charron chassis, monobloc, cardan, £8 14-16h.p. Darracq traveller's omnibus, monobloc, ga Zenith, £85; 8-10h.p. Alldays Midget, Zenith, smart repainted, £90; 2-ton Berliet chassis, twin solid extra long wheelbase, £100; 13.9h.p. Darracq 4-seate 1912, monobloc, enclosed valves, £100; freeho Thames bungalow plot, £100.—Below.

BUNGALOW Plots at Sunbury (40), £100 eac freehold, or let £12 each per annum; 8-10h. 2-cyl. Renault chassis, taxi type, £115; 10h.p. 191 Lagonda coupe, 4-cyl. monobloc, detachable wheel extra smart, £120; 14-20h.p. Renault chassis, 4-spee long wheelbase, bargain, £125; 38h.p. Daimler T.M. 4-stretcher ambulance, make fine commercial, £12 30h.p. National sporting 4-seater, £125; 11.9h. 1916-17 Argo sporting 4-seater, electric starter, dynam lighting, streamline, disc wheels, particularly smar £135; 16h.p. Bayard 1-ton van, twin solids, £13 12-15h.p. F.I.A.T. taxi type landaulet, monobl £135; 10h.p. 4-cyl. 1914 Deemster streamline seater, detachable wheels, smart, £145; 10h.p. 191 Horstmann streamline sporting 2-seater, 4-cyl. mon bloc, disc wheels detachable, self-starter, £145; 20h. B.S.A. chassis, £150; 10h.p. Calthorpe Minor strea line 2-seater, dickey, detachable wheels, monobl bargain, £165; 11.9h.p. Belsize streamline 2-3-seate dynamo lighting, monobloc, detachables, £185; 30h. 6-cyl. Minerva platform lorry, £185; 1914-15 Stud baker van, £185 practically new £450 American far tractor, probably 1917-18, bargain, £185; 15-20h. 1913 Star ¾ landaulet, detachable steel wheels, e closed valves, long stroke engine, £235; 16-20h.p. Sun beam chassis, enclosed valves, detachable wheels, speed, £285; 15-22h.p. R.M.C. interior-drive saloo 4-seater, opens, dynamo lighting, detachables, mon bloc, streamline, low, exceptionally smart, fine cond tion, bargain, £350; 3-ton De Dion commercia chassis, latest round radiator type, worm drive, e closed valves, steel wheels, £385; 16h.p. Sunbea streamline torpedo, dynamo lighting, detachable wheel 4-cyl. monobloc engine, enclosed valves, smart, £38 25-30h.p. Vauxhall chassis, 6-cyl. monobloc, detachabl wire wheels, pointed radiator, £450; all above actuall on view. Please call. Hours, 8 to 6.30. No busine on Sundays.—Douglas S. Cox, the absolutely straigh motor man, 6c, Lansdowne Hill, West Norwood, S.E Established 1902. [787

FARM TRACTORS AND IMPLEMENTS

WHAT Offers?—Practically unused £450 America farm tractor, 4-cyl. monobloc, enclosed valve Bosch mag., power pulley, one-man control; no reasor able offer refused.—On view, Douglas S. Cox, th A.S.M.M., 6c, Lansdowne Hill, West Norwood. (Se Cars.) [787

EXTENDED PAYMENTS.

EXTENDED Payments.—All makes supplied, new an second-hand; lowest terms.—Service Co., 292, Hig Holborn, London. [741

ENGINES.

REX 3½h.p. Ball Bearing Engine, mag., modern d sign; 12 gns.—14, Glenelg Rd., S.W.2. [787

8h.p. Precision Engine, new, induction pipes and ca burétter; £20, or near offer. Also wanted, 6in screw-cutting lathe.—Hellens, 151, New Cross Rd [774

IGNITION APPLIANCES.

BOSCH DU2, 6 gns.; Bosch single, Z type, wate proof, £5/15.—77, Acre Lane, S.W.2. [786

180° (Douglas) Thomson-Bennett Magneto, new £5/10; ditto, almost new, £4/5.—Service Co 292, High Holborn, London. [742

JEBRON Contacts, used by Messrs. Collier Bros Colver, Martin, making world's records.—Jebro 38, Herbert Rd., Woolwich, London, S.E.18. [X433

SEPT. 12TH, 1918.

THE MOTOR CYCLE

ESTABLISHED IN 1903

AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

Advertising and Publishing Offices:
20, Tudor Street, London, E.C.4.
Telegrams: "Cyclist, Fleet, London."
Telephone: 2848 City (five lines).

Editorial Offices:
Hertford Street, Coventry.
Telegrams: "Motorcycle, Coventry."
Telephone: 10 Coventry (five lines).

Northern Offices:
199, Deansgate, Manchester.
Telegrams: "Iliffe, Manchester."
Telephone: 620 City.

Subscription Rates: Home, 15s. 2d.; all countries abroad, 19s. 6d. per annum.
The Foreign rates quoted above apply also to men in the Services abroad.

COLONIAL AND FOREIGN AGENTS:
UNITED STATES—The International News Agency, New York. CANADA—Toronto News Co., Ltd., Toronto; Montreal News Co., Ltd., Montreal; Winnipeg News Co., Winnipeg; British Columbia News Co., Vancouver; Gordon & Gotch, Ltd., 132, Bay Street, Toronto.
AUSTRALIA—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin. INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Streamlining a Motor Cycle.

A CORRESPONDENT whose letter appears in our issue of September 5th makes some interesting remarks about streamlining a motor cycle. He states that the effect of streamlining the wires of an aeroplane is an increase in speed of about 6 m.p.h., and he suggests that similar efforts should be made in the case of a motor cycle, and that the front mudguard, cylinders, handle-bars, etc., should have fairing behind them, while the rider should sit in front of a sort of candle extinguisher the point of which extended to the rear. Many of our readers will call to mind the fact that such a device was actually used at Brooklands before the war and illustrated in our pages. Moreover, we have on many occasions pointed out that great advantages could be gained from streamlining both motor cycles and sidecars so far as possible, but we have no knowledge of so comprehensive an attempt as that suggested by our correspondent having been tried. This is perhaps the more remarkable seeing that motor cars designed for racing purposes have for years been streamlined to a considerable extent, and in the manner outlined above.

Spoke windage must be very great at high speeds, for spokes are numerous, and those above the centre of the wheel are all travelling at a higher speed than the machine itself; therefore it can easily be realised that great advantages would accrue from streamlining them adequately. The disc wheels which were introduced many years ago for pedal bicycles were, we believe, designed largely with the idea of reducing spoke windage, and they were doubtless very effective in this respect when made with smooth and polished surfaces. It was found, however, that these wheels were somewhat dangerous in a wind; therefore panels were cut out of the front wheels, which made them less liable to be influenced by a side wind, but reduced their efficiency considerably. Worse, however, is to come: certain persons disliked the plain appearance of the rear discs, and, entirely losing sight of their principal virtue, proceeded to decorate them by embossing patterns all over the surface. This seems almost incredible, but it is none the less true.

On Writing Advertisements.

WE have pointed out at times the advantage of a well-written small advertisement, and usually dwelt on the greater chances of effecting a sale when the details have been stated in a clear and concise manner. There is, however, another aspect to which we wish to draw attention, and, although this point certainly concerns the advertisers themselves, it is also of great importance to the buyer. We refer to the date of the machine as given in the advertisement.

It must be clear to many motor cyclists who take the trouble to read *The Motor Cycle* thoroughly, and in view of the Government prohibition orders to engineering firms, that many manufacturers ceased marketing the full complement of their models years ago. Yet we hear of complaints from people who after purchasing a machine have found that no motor cycle of that particular model was made in the year stated by the seller to be that of manufacture.

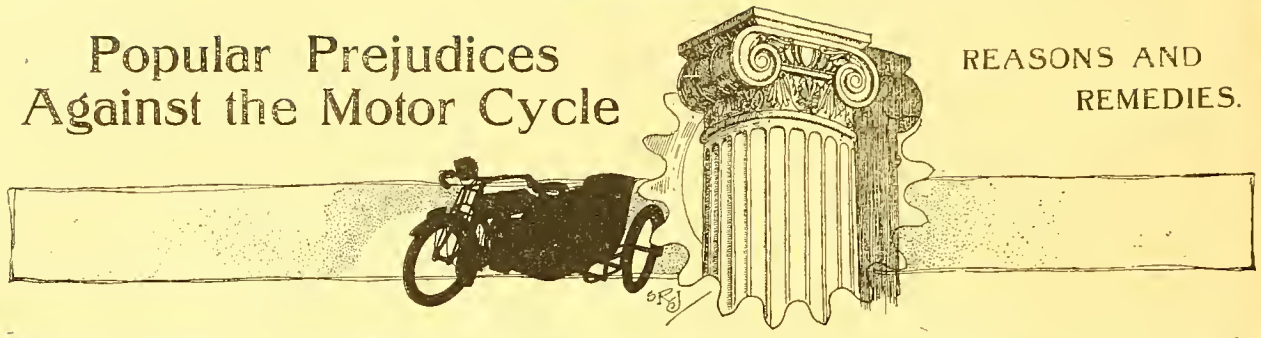
Again, greater care and accuracy should be taken when stating the date of manufacture of pre-war models. It is a temptation when a machine has been purchased late in the season to give the date of the following year when advertising it, especially if the alterations to the later model have only been few and not particularly obvious. It would save endless trouble and bitterness if more importance was attached to this particular point when disposing of a machine.

Another hint frequently ignored, yet very obvious, is to give a truthful description of the defects of a motor cycle before going to the expense of sending it by rail to a possible customer.

An index to the advertisements in this issue will be found on the page facing the back cover.

Popular Prejudices Against the Motor Cycle

REASONS AND REMEDIES.



THE population of Great Britain is somewhere about 44,000,000, of whom considerably less than 1,000,000 have any personal acquaintance with motor cycling. If the adults among the remaining 43,000,000 were asked what they thought of motor cycles, they would mostly reply that our mounts are dirty, noisy, smelly, dangerous, and very shaky. In other words, there is a widespread impression that the motor bicycle is an impossible vehicle, and that its manifest shortcomings are only tolerated by a few maniacs possessed by a lust for speed

Of course, this public prejudice is very largely nonsensical. Many thousands of pounds are annually invested upon motor cycles in normal times by hard-headed people who are neither young nor foolish. There are hundreds of well-educated professional men who have been ardent motor cyclists for ten or fifteen years. But there is an old saying that we do well to learn even from our enemies: and before peace reopens the markets it is worth the trade's while to study these jaundiced criticisms, and to disentangle the grain of truth from the chaff of prejudice.

The first count in the indictment is dirt. The average motor cyclist is undeniably grubby at the end of a long run. So are travellers by rail or by push-bicycle. Long distance road work is fundamentally unclean—and healthy. Motor cycles need not fear the charge of dirt, so long as it is honest, earthy dirt. Unfortunately, quite a lot of our dirt is *oil*; and the public are perfectly right in denouncing oily dirt. After the war no crank case must leak oil, no tappets must eject it.

Silence?

The second count is noise. Here we are treading delicate ground. On the one hand, motor cycles are far less noisy than trains, aeroplanes, trams and many types of car. On the other hand, the exhaust of a motor cycle is brusque and obtrusive; and some experts say that a silent motor cycle, owing to its small bulk and high speed, would be dangerous A purblind man can see a tram or a motor 'bus coming; but no cyclist looms large in the vision, and cycles should therefore be noisy. An experiment seems to be advisable. It is quite an easy matter to construct a silent motor bicycle. Let us put a thousand such on the road when peace returns. If they are a success, we will take steps to silence all motor cycles. If they are a failure (as I prophesy), the public will become enlightened, and instead of cursing the noise we make will learn to thank heaven for it.

Of course, motor cycles are dangerous. So are paraffin lamps, grape pips, taxicabs, tinned fish, drains, pacifists, butchers' carts, old ladies crossing the road, and lots of other things. Nevertheless, fast vehicles on public roads are undoubtedly potential nuisances. I wonder if it is really sensible to entrust machines capable of 60 m.p.h. to anybody who can raise five shillings for a driving licence. In the army they train everybody for his job, and do it well. Why should not motor driving licences be issued in peace time only to persons who hold certificates of having attended a short course of instruction, where embryo riders are taught how to take cross-roads and corners, and so forth?

Odour.

Smell? We certainly leave an odorous trail behind us, and our fragrance is hardly improving, what with bad petrol, benzole, shale spirit, castor lubricants, and so forth I am afraid this ill must be endured. It can be slightly mitigated if over-lubrication is guarded against; if engines are designed so as not to spatter their cylinders and crank cases with oil, and if crank cases are contoured with a view to cleaning rather than to permanent dirt encrustation.

Vibration? The spring frame can destroy this bogey in fact and to the public knowledge, though the latter really counts for less than little on this particular score.

These popular prejudices might be whittled down within three years to the bare bones of inevitable fact, viz., a little inevitable dirt, a little salutary noise, a little tolerable smell, a minimum of danger, and an absence of vibration. ROAD RIDER.

A picturesque spot between Kimpton and Codicote. A reminiscence of touring days in the time of petrol plenty.

Occasional Comments by "Ixion"

Flat.

WHATEVER is the matter? For months past nobody has attacked me with a vituperation-werfer in our Correspondence columns, or written coldly and judicially to prove that my notions can only have emanated from some drug-sodden inmate of Colney Hatch. Is my right-hand losing its cunning, or is it merely that all my watchful critics are Hunstrafing in Flanders? My love to them, and hearty anticipations of many another dust-up when it is all over.

The Vanished Gas Bags.

THE gas enthusiasts talked very big for a few months, and informed us that gas was going to oust petrol. Then gas was controlled, and as soon as the choice between "gas or nothing?" was transformed into "gas or petrol?" the unsightly top-hamper practically disappeared from our roads. I am quite aware that gas has never yet been tried out under fair conditions, *i.e.*, with engines, carburetters, and tanks designed for the purpose in the light of special research, and I fully admit that a car or cycle properly designed for gas propulsion might yet prove to be a very pleasant possession, and economical withal. But the sudden and almost complete collapse of the gas bags shows that certain people were making a wholly premature attempt to stampede us into abandoning a fuel which the British Isles may yet produce in considerable quantities. Now that a commercial company has been authorised to test gas fuel in high compression cylinders, we may get some reliable data. Previous experiments amount to little more than a desperate resource in a war emergency.

The Latest Brain Wave.

A LIFELONG opponent of kick-starters weighs in with the following notion for a post-war engine starter:

(1.) Put the piston on top dead centre.

(2.) Charge the cylinder with mixture by means of one of the patent vaporising dope squirts, with a decompressor opening the inlet valve for the purpose.

(3.) Twirl the handle of a special miniature "booster" magneto on the tank top.

(4.) Engine then starts without exertion.

Very nice, too. Unfortunately, a booster magneto costs more than a kick-starter. The trade number so many mugs amongst their customers that they would never trust us to distinguish between the two top dead centres (compression and exhaust), and it would be a shrewd bit of mechanism which would do it. Moreover, one usually finds that you can arrest a piston anywhere but on top centre, and that when the piston will poise itself on the top centre, there is seldom any compression worth writing home about. Finally, have we any guarantee that a single cylinder engine would respond at all regularly to such treatment if it could be applied?

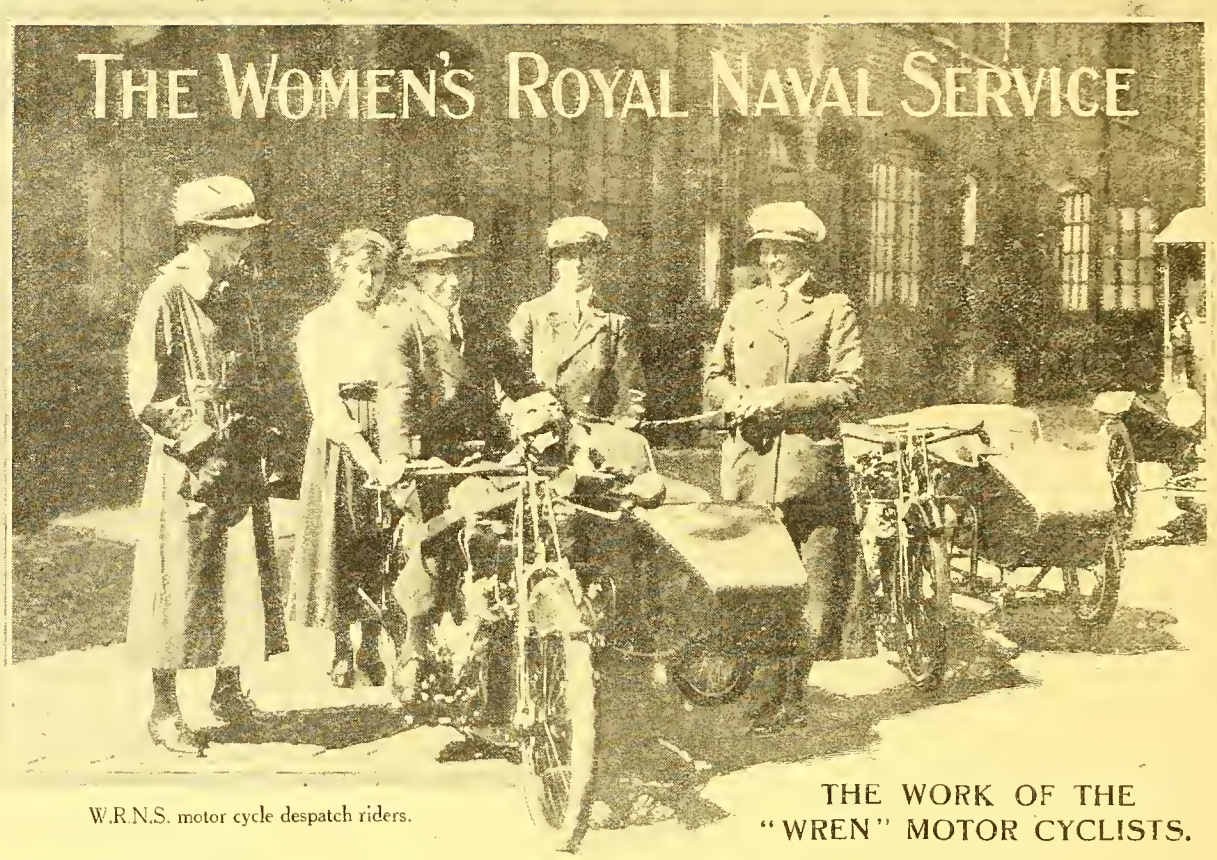
What is a Cycle Car?

I AM afraid I cannot endorse "G.H.H.'s" definition of a cycle car, which is based on its chassis being "mainly vertical." His classification would include the cars of the Brennan monorail, which is absurd. These classifications are usually more or less arbitrary. "Motor bicycle" is sound enough, being limited to two wheels; "light car" is arbitrary, as a host of intermediate types link up the Baby Peugeot to the 12-16 h.p. Sunbeam, for example; and "cycle car" must remain arbitrary. The point is on a par with the question whether a mule is a horse or a donkey. A cycle car is the hybrid offspring of a motor car and a motor bicycle. For competition purposes it is necessary to frame a rigid and arbitrary definition; and this will be repeated if the number of post-war cycle cars justifies their inclusion in the principal trials. For practical purposes in daily life, riders christen the various vehicles according as they exhibit affinities with the car or the cycle. Thus, the G.N. is a cycle car for most people, and the 10 h.p. Singer is a car. Why worry?

The Charm of the Four-cylinder.

THE reminiscent article on four-cylinder machines in our issue of August 1st threw me into a reverie, making me recall past trips on such machines in the days when motor cycling did not mean side-stepping three ton lorries in ten inches of mud spread over sunken *pavé*. My earliest recollection of the type is of a pair—a Durkopp and an F.N., I think—entered in a six days End-to-end run about 1905. The entire entry watched them with mixed feelings. When rain was about, and our ⅞in. belts were shrieking over the slippery pulleys, we coveted the shaft drive of the fours. On odd occasions they would rev past us with all four cylinders working, and a note which put our bang-bang singles to the blush. But on the average we saw them stalled by the roadside, with their drivers labouring feverishly, and as one sparking plug and pair of valves gave us plenty to think about in those days, none of us were converted to the fours. The Durkopp was driven by an alien of sorts, who could hardly speak a word of English; his observer, A. C. Wright, must have found the triple *rôle* of interpreter, auxiliary motor on certain hills, and advising engineer quite exhausting. Some years later I bought an a.o.i.v. F.N. which reminded me of a lovely woman who has been spoilt: it could be so nice, but it usually elected to be perfectly horrid. Then I sampled a Henderson, and completely lost my heart to it. When you slammed its throttle open it gave you a sort of "left behind" feeling in the small of your back, like a scout aeroplane does when a jump is put on it. It started if you stroked its back mudguard, and made very short work of several fancied speedsters it was matched against. Since then I have sampled more than one experimental four, and I must say they are going to be popular.

THE WOMEN'S ROYAL NAVAL SERVICE

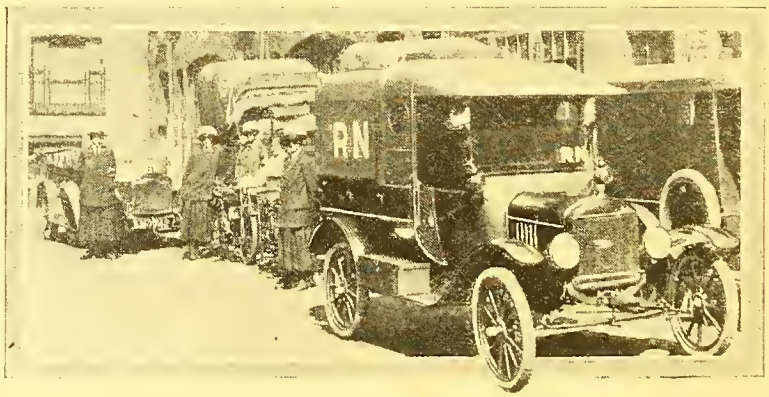


W.R.N.S. motor cycle despatch riders.

THE WORK OF THE "WREN" MOTOR CYCLISTS.

IT is not generally known that certain of the Wrens, as the members of the Women's Royal Naval Service are familiarly called, use motor cycle sidecar outfits for despatch riding. There are not many of them, but the fact remains that the motor cycle has been found to be no less invaluable to this branch of the Service than to others, so far as this particular work is concerned.

The gallant girl motor cyclists in navy blue (they wear a uniform as nearly like that of bluejackets as feminine garments will permit) whose photographs accompany this short article are quartered in a garage situated in the West End of the Metropolis. They are under a chief section leader, who ranks with a chief petty officer R.N. She and her colleagues have charge of this small unit, which includes the motor cycles shown and a small fleet of cars. They are all skilful mechanics, have installed a small but well-equipped workshop in a former harness room in the mews, and recently took down one of the motor cycle engines, cleaned it of carbon deposit, ground in the valves, reassembled it, and made an excellent job of the overhaul. Few people would have realised previous to the war that women would have done this kind of work.



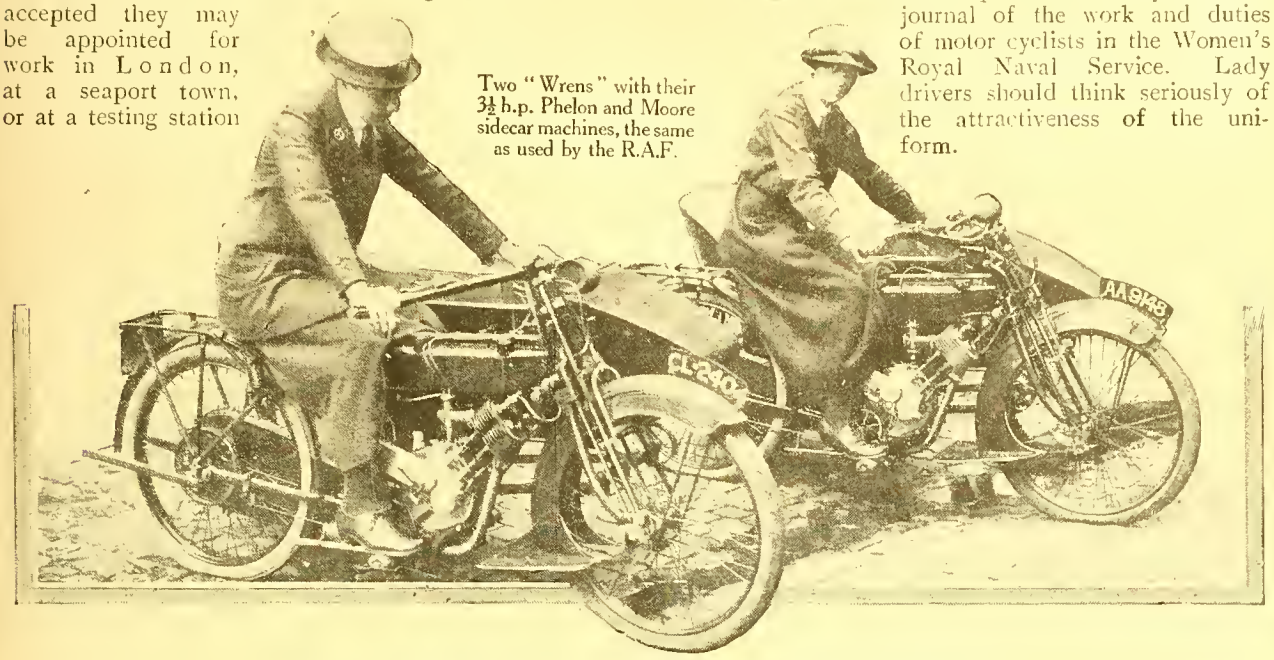
A fleet of vehicles in a W.R.N.S. garage.

The Wrens of the rank and file are referred to by their officers as "ratings," and the officers, who wear rank badges similar to the officers in the Navy, but of light blue instead of gold lace and with the executive curl, are addressed by the ratings as "Ma'am." For example, their chief, Dame Catherine Furse, wears on her sleeve a broad light blue ring with a narrow one above it, which is similar to the rank badge of a rear-admiral. Subordinate officers connected with motor transport wear a steering wheel on the lapel of the tunic, while ratings wear the same badge on the arm. At present the motor cycles used are P. and M.'s, but in future they will be Sunbeams and Douglases. The riders we saw seemed keen and more than just pleased with their work.

The Women's Royal Naval Service.—

In London the hours the girls have to be on duty are from 9 a.m. to 7 p.m., or 8 a.m. to 6 p.m. Those whose homes are in the country are billeted in W.R.N.S. hostels, but those who reside in Town may live in their own homes and are known as "immobiles." The Wren motor cyclists must be thoroughly conversant with their machines before they join up, must have had at least three months' driving experience, and must know how to do running repairs. When accepted they may be appointed for work in London, at a seaport town, or at a testing station in the country. As may be imagined, the work is most interesting, and the fact that it may entail work at the seaside is most attractive. The pay of the Wren motor cyclists is 35s. a week, rising to 40s. for chief section leaders.

Application for enrolment should be made to 15, Great Stanhope Street, London, W 1. We have already made reference in *The Motor Cycle* to the work done by women motor cyclists in the R.A.F., but this is the first account published in any technical journal of the work and duties of motor cyclists in the Women's Royal Naval Service. Lady drivers should think seriously of the attractiveness of the uniform.



Two "Wrens" with their 3½ h.p. Phelon and Moore sidecar machines, the same as used by the R.A.F.

A NEEDED IMPROVEMENT.

BEYOND question one of our greatest needs before the war was a motor cycle engine which would run nicely when declutched. This particularly applied to sidecar machines, but was true also of solo mounts. I do not mean that engines were liable to choke when running free and light: you could easily set your levers so as to ensure against that. But when you owned an engine which would keep cool for a minute or two when stationary, and a clutch and neutral gear position, it was tiresome to be prevented by noise and clatter from keeping the engine going during any but the briefest stops. Of course there were a very few select engines which behaved in lady-like fashion under such circumstances, and did not sound like a machine gun slaughtering massed Huns. Such engines were extremely rare, whereas they ought to have been universal. Three levers were concerned in the slow-running setting, and only painstaking riders could set the trio with ease and certainty, whereas any old fool can lift his toe off a car accelerator, and be sure that the engine will tick away unostentatiously and smoothly until more power is demanded. Finally, these engines only produced their rather uncertain best behaviour if they were kept very carefully tuned; many of them were delivered by the makers minus this particular excellence, though others, passed by a good tester, were tolerable.

After the war we hope for improved cooling and more scientific lubrication, both of which should extend the period for which a motor cycle engine can be run stationary. The need for improved slow running will therefore be accentuated.

Decompressors to the Rescue.

I hope manufacturers will pay attention to the point, which should not prove too baffling. For example, nobody would assert that a single-cylinder engine, running with a decompressor in action, can be compared with a well-tuned Rolls-Royce. But by a certain temporary fake I succeeded in making a 4 h.p. Triumph run freely on its decompressor for quite a time, and determined that this crude parody of ideal slow running was very considerably preferable to the standard pattern. V twins, flat twins, and four-cylinders are, of course, much more amenable to treatment. I have had no time to experiment, but there can be little doubt that a special slow running jet and choke tube, coupled by a by-pass to the induction pipe on the engine side of the throttle, is a main essential. With weak suction through a large choke at a large jet, the mixture must be problematical; with strong suction concentrated on a small aperture, the method adopted on practically every car carburetter, success should not be difficult, and a few experiments still on record were certainly encouraging. The pilot jet and by-pass might be combined with a decompressor if necessary.

ROAD RIDER.

SIMPLIFYING THE DYNAMO LIGHTING SET.

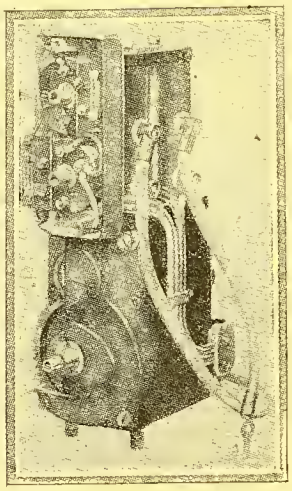
THE REQUIREMENTS OF A MOTOR CYCLE OUTFIT.

MANY accessory manufacturers are experimenting with dynamo lighting sets for the post-war motor cycle, so that neither the solo nor the sidecar driver will be unduly limited in his choice of a suitable installation.

There is much to be said in favour of the combined lighting and ignition system, but it is evident such a combination can hardly materialise at present in the face of the truly marvellous success of British magnetos. Considering the large amount of British capital sunk in exploiting the wholesale manufacture of the magneto in this country since 1915, it is not to be supposed our home manufacturers will be all too ready to throw over the high-tension magneto just when practical results have demonstrated that the British article is in nowise inferior to the German product, and they are assured of so much backing both from the trade and the private owner in the future peace programme.

Suitability of the Car Type.

As a lighting fitment the motor cycle dynamo system bristles with difficulties which are not immediately apparent to the non-technical mind, but the fact that such promising service has been obtained from the earlier models augurs well for the future. In the car world, where size and weight are of less importance, the results, however, have not been too rosy. The writer noticed in a recent Army report that the officer-in-charge of a certain Overseas repair depot laid special stress on the need for greater reliability in both dynamos and batteries where called upon to withstand service conditions during the winter months in France. Of the apparent faults which practical experience has brought to notice in the motor cycle installation, the majority are sufficiently evident to be readily understood by the average intelligent reader, and in view of what has been stated above perhaps the makers of the existing designs will forgive the writer's pointing out that too much care appears to have been taken to render the motor cycle dynamo set an exact replica of the car installation. This is unnecessary, and is not conducive to satisfactory results. The error of too closely following car practice has often been demonstrated.



Circuit-breaker side of the Remy generator. This system comprises a dynamo and coil, which are fitted in the place of the ordinary magneto; the coil converts the low-tension current to high-tension for the ignition; the low-tension direct current charges the storage battery, works the horn and lights the lamps.

The principal faults in the past have been due to the batteries being too small and of an unsuitable pattern, attempting too much in the intensity of the light produced, thereby necessitating a large and cumbersome dynamo, which again reacts unfavourably on the battery. For an ordinary 5-7 h.p. sidecar combination past experience has justified the assumption that a head lamp of 12 c.p. is sufficient for all except the confirmed road burner or the London-Exeter winter trial enthusiast. For the sidecar and tail lamps a modest 2 c.p. is sufficient. With a normal battery pressure of 8 volts the head lamp bulb will absorb 1½ ampère, and if the sidecar and tail lamp bulbs are of the 4 volt variety and wired "in series" a further ½ ampère will cover their combined demand. This will give a total consumption of 2 ampères, and is sufficiently small to overcome the necessity for dimming in traffic or when standing.

Luxury Lamps.

A word of warning will not be out of place here concerning the inclusion of electrical novelties such as cigar lighters, speedometer lamps, etc., which, while being somewhat useful and ornamental, nevertheless consume an excess of current which the poor battery is called upon to supply without the satisfaction of a corresponding entry on the credit side. Such additions should be strictly limited to a single inspection lamp for puncture repairs or roadside engine adjustments, and this can be rendered virtually non-consuming by fitting it with a bulb of 4 volt pressure and of the same candle-power as the sidecar and tail lamps. If an adapter or plug is wired on the end of the inspection lamp it can be inserted in place of either the sidecar or tail lamp bulbs without increasing the total consumption. The writer usually selects the sidecar lamp for such plugging-in purposes, as the temporary loss of light from this lamp is not attended with any risk of either a forward or rear collision. The "will-o'-the-wisp" movement of the inspection lamp usually indicates to an oncoming vehicle the presence of an obstruction ahead.

The battery is the stumbling-block of the problem, and it is here where new ideas are most required.

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Some idea as to the thoroughness with which the subjects interesting motor cyclists are treated may be gathered from the following names of sub-sections in the article "OVERHAULING A MOTOR CYCLE": Summary; The Wheels; The Frame; The Tank and Fitments; The Carburetter; How the Engine Works; Overhauling the Engine; The Driving Gear; The Ignition Apparatus; The Brakes; The Reassembling. With four drawings to explain the reading matter. "OVERHAULING A MOTOR CAR" has the following titled sub-sections: Summary and Explanation; The Preliminary Examination, chiefly by sight; Bearings; Carburetter; Couplings, etc.; Flywheel; Clutch Fork, etc.; Change Gear; Steering Gear, etc.; Frame; Springs, etc.; the Ear Test; Testing the Engine; Compression Testing; Testing with the Engine Running; Worn Bearings; Knocking; "Popping"; "Hunting"; Silencer at Fault; Clutch; Change Gear; Undue Heating of Circulation Water; Lubrication; Testing on the Road; Ignition; Valve Timing; Defective Compression; The Shafts. A COMPLETE OVERHAUL: Testing for Alignment; Swivel Bearings; Wheel Bearings, etc.; Tyres; Removing Valve Chamber Covers; Grinding in Valves; Removing the Engine; Testing Truth of Pistons; Removing Flywheel; Timing Gear; Magneto; Gudgeons and Pins; Case-hardening; Removing Piston Rings; Engine Repairs; Testing Bore of Cylinders; Truing Journals; Truing Brasses; Bedding the Crankshaft; Big-end Bearings; Renewing Clutch Leather; Ball Bearings; Gear Renewal, etc.; Oiling Axle Springs; Aligning Gear Box and Engine; Reassembling; Engine Accessories; Brakes. This article has fifty-six illustrations and working drawings.

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Testimony that Counts.

Mr. T. G. RIORDAN, Upper Tooting, London, writes: "With absolutely no knowledge of the trade to guide me, after reading the articles on Boot Making in the 'Amateur Mechanic,' I was able to make a pair of boots, partly hand-sewn and partly riveted—and to make them well. Since then I have made a very fine pair of lady's shoes. I consider that **nothing I can say about the work could be too much praise.**"

Mr. T. F. GARNETT, B.Sc., writes: "The books are of considerable practical utility in these days, when 'Mechanics' are all to the fore. My two sons, engineers in munition works, are much interested. One has made up his mind to start his own boot-repairing from the instructions given, while the younger is about to clean his watch. They consider that the articles on **'Turning,' 'How to Use the Micrometer,'** etc., are invaluable to all who wish to do well in munition or other bench work; and that is my opinion also."

The Motor Cycle says: "It should find a place in the library of every motor cyclist."

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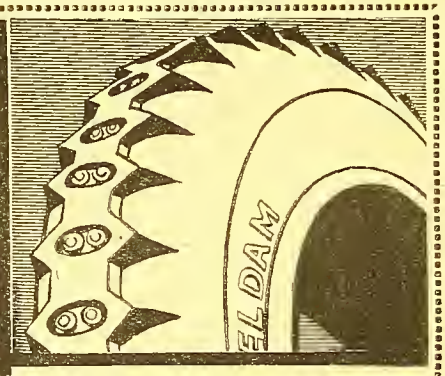

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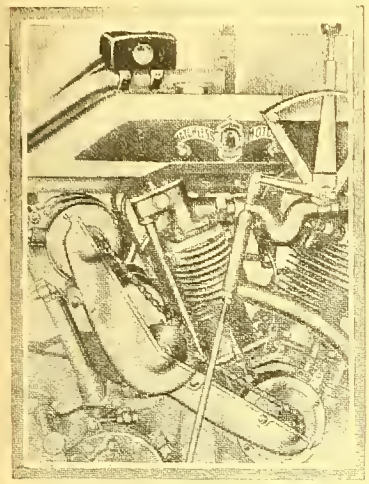
Simplifying the Dynamo Lighting Set.—

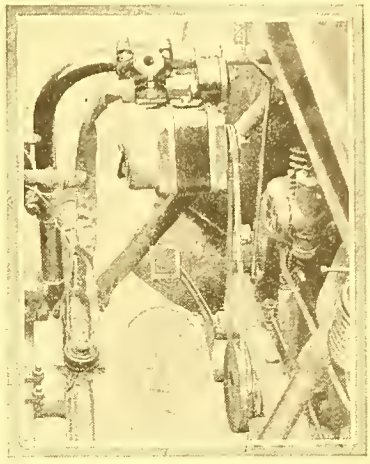
The standard celluloid-cased lead plate battery of the ignition type, if of suitable size and first-class manufacture, will give very good results in skilful hands, under frequent supervision, but if the attention is casual and infrequent trouble sooner or later will come. Perhaps recent improvements in the Edison alkaline (steel and nickel) battery, coupled with the now assured better commercial relations between ourselves and our American cousins (or is it brothers?) after the war, will give a much needed fillip to experiments with this interesting invention. On our side of the water the Fuller Block battery is an attempt at an alternative design of lead battery minus the usual plate or grid. But whatever type of battery is selected it must be built with a view to continuous use and a high reliability factor.



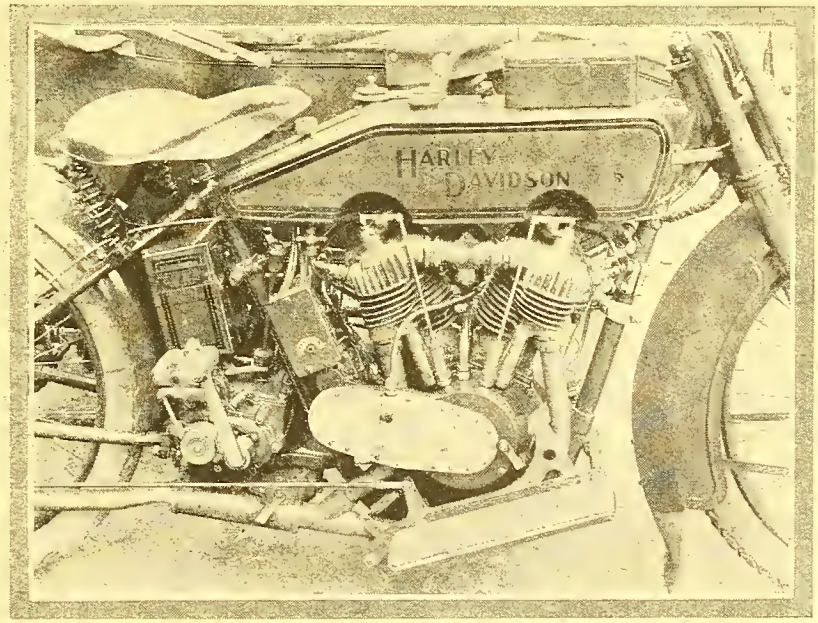
An 8 h.p. Matchless twin fitted with a Lucas dynamo lighting set. The drive is from the magneto shaft.

The capacity of the battery must bear some relationship to the lamp consumption and the dynamo charging current. The former, unfortunately, can be more easily allowed for than the latter. It would be comparatively easy by means of a special design of lamp cap and a plentiful supply of spare bulbs at depots all over the kingdom for a manufacturer to render it impossible to use any but the right candle-power and type of bulb in each individual lamp. In this way he would ensure a standard normal discharge rate for which his battery would be designed. The boot begins to pinch, however, when the charging current is considered.

Now a motor cycle dynamo will commence to charge under normal gear ratios at about 15 m.p.h., and at this point the charging current can be assumed as of the order of ½ ampère. If this were maintained as the standard rate of driving it would be evident the driver would be courting trouble when the shades of night descended and his lamps were called into commission, unless he had travelled a sufficient number of hours at this speed to allow of the battery reaching the completely charged state. Even so, prolonged night driving would speedily reduce this asset to a debit amount on the other side. Further, owing to certain complex electro-magnetic laws utilised when designing the dynamo, the current does not increase proportionately with the speed, but it is practically impossible at the present stage of progress to ensure that, if the machine cited above were driven continuously all out at 30-40 m.p.h. for hours on end, the battery would not be in a dangerously over-charged condition, and consistent treatment of the kind would speedily disintegrate the active material in the plates. Between these two extremes there is a margin of speed within which matters will operate to a satisfactory end, and, whilst it is the user's duty to restrict his energies to within the confines of this margin, it is equally important for the maker to see that his dynamo has a practically horizontal component over as wide a margin as modern science enables him to attain.



An alternative method of fitting the dynamo, utilising the front sidecar stay as the carrier.



A Remy combined ignition and lighting generator fitted to a Harley-Davidson.

Provided the battery is fully charged, it should be possible to ensure twelve hours' continuous light without recharging in order to prevent the motor cyclist becoming stranded by a minor dynamo breakdown when out of reach of a garage. This condition is based on the fact that, however lucid the instructions, there will always be a certain proportion of individuals who will prefer to leave the adjustment of their lighting installation to the tender mercies of

Simplifying the Dynamo Lighting Set.—the garage hand rather than attempt to probe into the mysteries themselves.

The installation for a 5 to 7 h.p. outfit mentioned previously would have a battery capacity of 24 ampère-hours, and would be of a size and weight easily accommodated under the sidecar seat. It would be designed to admit of a charging current of 2 to 3 ampères, and the dynamo could therefore be wound to supply this current at its most satisfactory speed range at a pressure of 8 to 10 volts. For ordinary touring purposes the speed range would be 18 to 25 m.p.h. for the horizontal part of the curve and without detrimental increase in current up to 30 m.p.h. For higher speeds than this it would be advisable temporarily to switch the dynamo out of circuit.

Replacing the Cut-out Switch.

In place of an automatic cut-out switch, a free-wheel device similar to the C.A.V. driving pulley would allow the dynamo to "motor" with a minimum call on the battery and overcome the expense and petty annoyances inseparable from some types of automatic switches. The "buzz" of the free wheel would be sufficient warning to the driver to switch off the dynamo circuit when standing.

The Sidecar Instrument Board.

The switch box should be a simple, easily understood attachment containing a fuse, a charging switch for the dynamo, a lighting switch for the lamps, both capable of independent operation, and a self-contained ammeter to indicate permanently the dynamo charging current. The ammeter should be sunk flush with the cover of the switch box. The cables should be two-core for the lamps and three or four-core for the dynamo, and preferably rubber covered. There is an excellent type of electric cable on the market for works use known as "cab-tyre sheathed," and, as its name implies, the cable is finished with a layer of hard, wear-resisting rubber. Such a cable would be ideal for motor cycle use. Assuming the whole installation is both carefully designed and as carefully fitted, the writer is convinced that it will be possible on lines indicated above to equip the average family sidecar with an electric lighting installation which, properly used, will be nothing but a source of convenience to the owner.

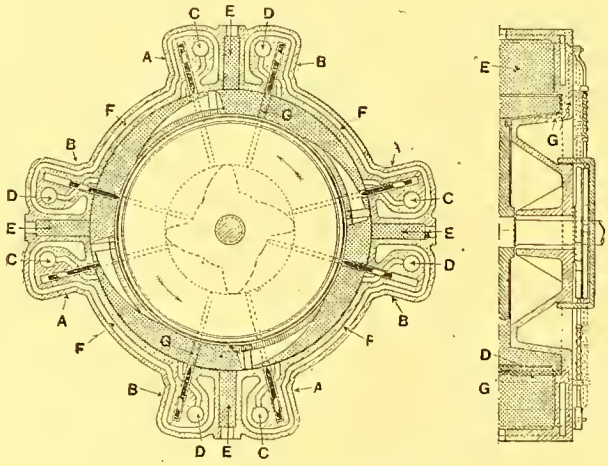
FRANCIS E. SCHOFIELD.

A ROTARY ENGINE DESIGN.

An Ambitious Attempt to design an Engine with a Firing Torque equivalent to a Sixteen-cylinder Reciprocating Engine and to weigh ½ lb. per h.p.

UNDOUBTEDLY the problem of the rotary engine embodying a rotor in lieu of pistons and cranks is a very fascinating one, and it is not surprising that so many inventors have endeavoured to solve it.

The accompanying illustrations show, in diagrammatic form, one of the latest attempts in this direction, which, while not entirely new in its main elements, is interesting as an ambitious design in which the inventor has aimed to secure an impulse effect equal to that of a sixteen-cylinder engine working on the four-stroke cycle. One may justify the attempt to produce such a prime mover when it is remembered that, if practicable, an engine of this character would weigh no more than ½ lb. per h.p. with a torque very much resembling that of a turbine.



The Burnard rotary engine design.

A. Inlet abutments
B. Exhaust abutments
C. Inlet ports
D. Exhaust ports
E. Compression spaces
F. Water jacket
G. Slots for sliding abutments A and B

It will be seen that the design embodies a circular "piston" member with four cam-like projections, which rotates in a counter-clockwise direction in an annular casing.

The casing contains eight sliding abutments, which in the design illustrated also act as slide valves. These are actuated by rods and cams on the outside ends of the rotor shaft. These abutments may be said to act as does the top of the cylinder in a reciprocating engine, and are made to rise and fall to allow the "piston" projections to pass beneath, trapping the compressed charge behind the latter.

The action of the engine is somewhat difficult for the novice to follow, but a close study of the drawing will reveal the cycle of operations. In this connection the reader should note that the two projections shown at the right and left-hand *sides* always serve to compress the gas in front of them whilst explosions are taking place behind them. The projections shown at the top and bottom are always drawing in a charge behind them whilst driving out exhaust gases in front of them.

We think, however, that the inventor would have great difficulties to overcome in connection with the lubrication of the slide valves and in obtaining and retaining compression. We remember an almost identical design as this some dozen years ago, but it was abandoned later for the reasons we mention.

The name and address of the present designer—with whom any interested reader may communicate—are Mr. S. L. Burnard, 212, Wellesley Road, Ilford, Essex.

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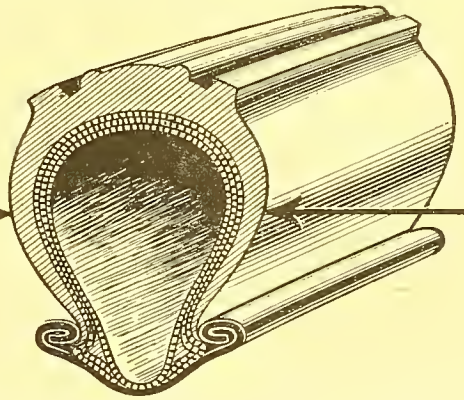

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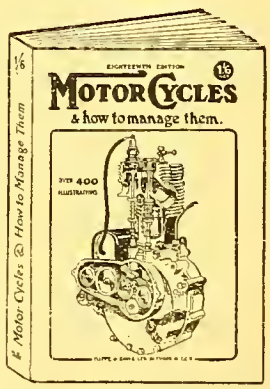

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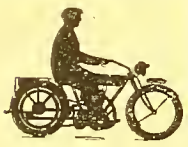
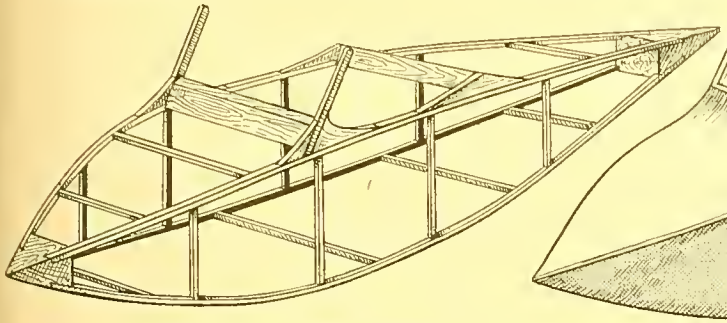
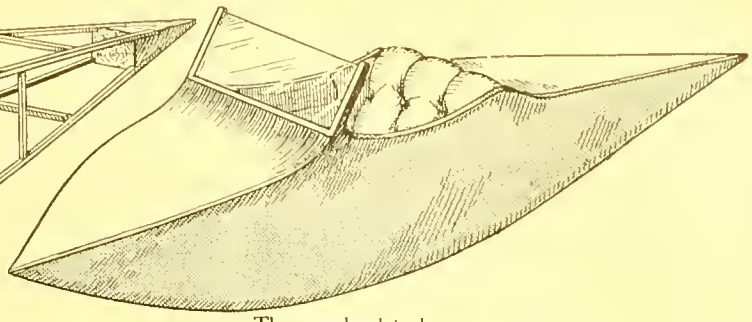


A Simply-constructed Sidecar Body.

Some Information for the Amateur who may wish to make his own Sidecar Body.



Framework of the sidecar assembled.



The completed body.

MUCH has been said of the streamline sidecar body, and from time to time interesting sketches and designs of bodies possessing this feature have been published in this journal. Many of these bodies have shown artistic lines, and some have been practically streamline, but the idea of simplicity or cheapness of construction, which is the object of the present design, has been neglected.

The Frame.

This should be of material about ⅞in. × ⅝in., and with this the curved members could be bent easily while cold, and would not necessitate steaming. In the rear of the body the sides should be supplemented by a solid piece of ⅞in. board on each side, passing vertically between the top and bottom curved members. These would give proper strength for the spring anchorage bolts, and would render the body usable on the old-fashioned chassis, the rear spring anchorage bolts of which were very high up. Having measured the width between the springs and taken all the necessary dimensions, a drawing should be made as large as possible of the outline of the plan and elevation. If possible the elevation should be drawn out full size on the floor of the workshop and small blocks of wood nailed to it round which to bend the curved members. Having these bent for one side and held in position, the upright side members should be marked off, and the mortise also marked on the curved members. These marks may all be transferred to the material for the other side to save repetition. The noses should then be marked out from the drawing on the floor. These should be made of oak or other hard wood, and should have a ⅞in. square housing at each corner about 5in. long to receive the curved members. The mortises in the curved members may now be cut and the tenons on the vertical side members prepared to fit them.

Fitting the Sides.

The sides are then ready for assembling. In doing this the curved members should be screwed and glued to the nose at the forward end, and coaxed round the short forward vertical members first. Having one side frame completed, the plan of the body should be drawn on the floor, as was done in the case of the elevation, and from it the cross members and floorboards marked out and cut. If desired the floorboards could be made so as to dispense with cross members for the bottom. The other side should then be worked together from the forward end in a similar manner, the bottom boards, which should be of ⅝in. deal, being then screwed up.

The frame should afterwards be tried in the chassis and the spring anchor bolts fitted. The windscreen frame and curved chocks being fitted, the frame is ready, with the exception of the top, for sheeting up. For economy in sheeting the three-ply should be bent round the frame and marked out, and, after cutting to shape, should be secured with glue and small brass screws pitched a few inches apart. It is annoying to find on some of the most expensive coachbuilt sidecars that after continuous use in bad weather the edges curl up and open on account of the three-ply edges being insufficiently protected. It will therefore be of great service to cover the edges of the body with a strip of ⅛in. threequarter-round moulding, this being screwed down over a good plaster of paint and red lead.

The Seat and Upholstery.

The position for the seat may best be found by experiment. The upholstery, if to be done properly, is work for a craftsman, but a very passable substitute for the seat back can be made by covering a wooden frame with American leather cloth and filling with fibre. Buttons should be fixed in front and light cord drawn through the back. A few pieces of strong canvas strips stretched across the frame at the back will serve to take the button cords and to prevent the upholstery from sagging. The body previous to sheeting the top should receive a coat or two of paint.

Having completed the sheeting, the outside should be cleaned off with a plane and thoroughly sandpapered. To get a fairly good surface for the enamel it will be necessary to give four or five coats of priming, each one to be thoroughly sandpapered or pumiced down when properly dry. A mixture of equal parts of white and red lead will be found a very good paint for this purpose. The windscreen frame should be varnished or stained and gelatine fitted with light laths screwed to the frame inside, and a piece of light mahogany screwed down on the top of the sides where the passenger's arms come will put a finish to the rest of the work. It will be noticed that no door has been allowed for, as this is the weak point on any amateur work the writer has seen and is very difficult to make properly.

GERALD COATH.

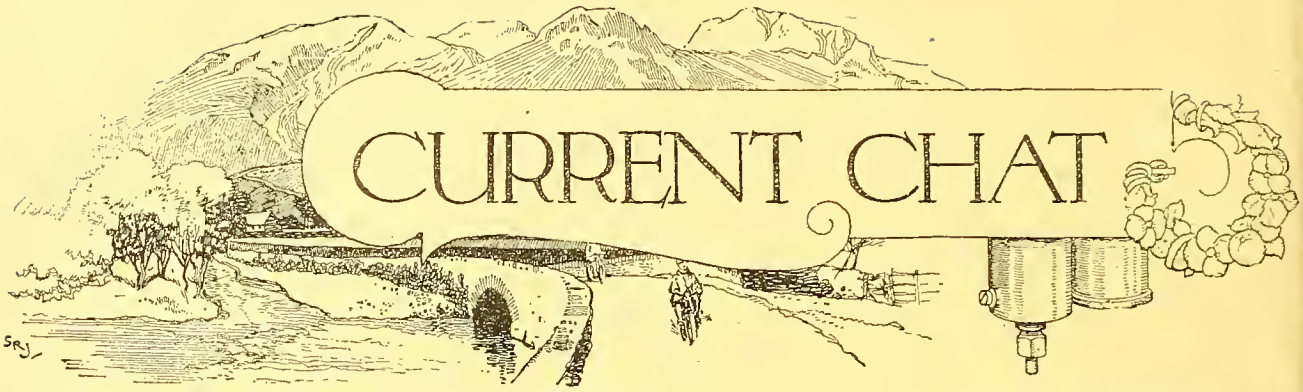
THE RENOVATION OF SECOND-HAND MACHINES.

THE war is not yet over, and may not be for some time, but still we must look ahead, and, so far as can be seen, there will be a severe shortage of motor bicycles as soon as hostilities cease and the petrol restrictions are relaxed. Factories will have to be reorganised for production, and so will be unable to turn out machines for many months, and material will be difficult to obtain. Meanwhile, returned soldiers and weary war workers, anxious to restore their health by enjoying the pleasures of motor cycling, will, unless steps are taken to provide them with machines, have to go without until the manufacturers are able to resume their normal output.

There is a very obvious remedy, however, which, if adopted, will go far towards relieving the minds of those who are anxious to take up motor cycling as soon as possible after hostilities cease, and also of the manufacturers, who, naturally, are desirous of keeping in touch with their customers.

My idea is that the manufacturers should take every opportunity of purchasing their later models which have been in use during the war. Quite a number of these have had very light work, and are probably almost as good as new, while others, though they have been worked hard, are quite capable of repair. The manufacturer should then strip these machines entirely, execute all necessary repairs, replace all worn parts, then re-enamel and replate the machines, and sell them in an almost new condition as "renovated motor cycles," and guarantee them, say, for two or three months. After the war, Army motor cycles no longer required by the military might be treated in the same manner This should be well worth doing.

AILETTE.



Times to Light Lamps.

SUMMER TIME.

Sept. 12th	... ...	7.52 p.m.
,, 14th	... ...	7.48 ,,
,, 16th	... ...	7.43 ,,
,, 18th	... ...	7.38 ,,

Motor Transport Volunteers.

We are often asked for the address of the headquarters of the London Motor Volunteers. This is now 225, Oxford Street, W. Any motorist able and willing to assist should apply to that address.

A Novel Lead for Strikers.

Certain workpeople of Messrs. Douglas Bros., Bristol, recently followed the lead of their Coventry brethren; in other words, they went on strike. We, however, have yet to hear that any Coventry workers have followed the lead given to them by the Bristol brethren—these latter afterwards returned to work and *apologised* for having gone on strike.

The Police Again.

An officer on leave from the Front and residing at Esher sent to Bath for his motor cycle, which was delivered by road. The man who rode it home and the officer owner were both summoned, the former having to pay costs and the latter a fine of £1. The only petrol used was that already in the tank when the officer went away eighteen months ago.

Post-war Roads.

Just before the beginning of war serious attention was being directed in many cases for the first time to the question of the roads in our large cities. The outbreak of war, for instance, found a half-completed circular road that was to enclose Birmingham totally. The road, of course, still remains in an unfinished condition.

The Road Board has recently issued a report on the question of arterial roads into London. The main item of this report is the suggestion that a new road to relieve the Oxford Road should take the form of "Western Avenue," which would be an almost entirely new road, over fifteen miles long, starting from Blenheim Crescent, Kensington, and joining the existing Oxford Road about one mile beyond Uxbridge. The cost of this road would approximate something like two million pounds. As to whether or when the road will be actually begun the report is silent.

The Limit at Last?

If the following instance is not the limit in police intelligence—or the lack of it—it would be more than merely illuminating if anyone aware of a worse case would announce the details.

A certain volunteer corps recently held a surprise mobilisation test, *i.e.*, a mobilisation such as would be necessary in the event of invasion. Naturally, motors were employed, and a policeman stopped one of the cars, and demanded to see the driver's licence. This was not forthcoming, and the culprit was duly called to book in the local police court, situated near the East Coast, by the way.

During the hearing of the case—which was finally dismissed—the magistrates' clerk asked the police what course, as regards driving licences, motorists would be expected to pursue in the event of a real invasion. The omniscient superintendent replied that motorists whose cars were likely to be used should have their licences in readiness!

Exclusive and Invaluable Information.

We are thus in a position to announce, on absolutely unquestionable authority, that if the Huns ever invade us no motors may be used for transport or despatch riding, unless the drivers have current driving licences.

A Prophecy.

If ever the invasion materialises, we may thus expect to see the following notice—or one to this effect—posted in those places where men most do congregate:

"THE GERMAN INVASION.

"It is impossible to cope with the invading forces without ample supplies of mechanical transport. Up to the present, these are not available, because so many motor car and motor cycle owners, who have for the last few years not had their vehicles in commission, have not current driving licences, and the police—on our side the line—will not allow the use of motor vehicles on the public roads unless the drivers have all licences up to date. All owners of motor vehicles are therefore urgently requested to take out driving and local taxation licences, as it is feared that the enemy, who may be disinclined to treat the police requirements with due seriousness, may seize such vehicles as have been necessarily left in garages, and use them for their own purposes.

"B. UNKUM,
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Special Features.

SIMPLIFYING THE DYNAMO LIGHTING SET.
THE THREE WHEELED CYCLE CAR
THE "WREN" D.R.'s.

Joining the R.A.F.

Full particulars of how to join the R.A.F. were given in our issue of March 21st last, a copy of which issue may be obtained from our publishers. There is also an R.A.F. Information Bureau at the Hotel Cecil, Strand, W.C.2.

"The Cat and Fiddle."

The agitation against the closing of the "Cat and Fiddle," situated on the Macclesfield-Buxton Road, an inn well known to tourists, has resulted in a long lease being entered into by a gentleman who proposes to rebuild it.

Lubricating Oil in Germany.

Complaints are rife in Germany of the poor quality of lubricating oil at present supplied for various purposes. It is reported to be so inferior that it is unable to prevent the bearings from getting hot, and fires are prevalent in consequence (?).

Roadside Advertisements.

The Pennsylvania Highway Commissioner, in recommending a "signboard tax," says: "Soon the trip from Philadelphia to Pittsburg will be through solid lands of signboards, if the construction of them continues at the present rate." The revenue from the tax should, he suggests, be devoted to road repairs.

Motor Cycle Instruction.

We should be pleased to hear details of any motor schools which make a point of taking motor cycle pupils. There are plenty of sound, reliable schools, officially appointed by the Royal Automobile Club, which undertake the teaching of motor car driving, but, as we have received several enquiries of late concerning schools which undertake the teaching of motor cycle driving, there appears to be an undoubted demand for tuition of this nature. We imagine, therefore, that it would be distinctly to the advantage of certain of the officially-appointed schools or of some enterprising firm to institute a motor cycle course open to men and women. Candidates, both men and women, for the motor cycle branches of the Services would undoubtedly benefit by taking a course of instruction.

B.S.A. for Ice Cream.

An ice cream vendor daily visits on his B.S.A. and sidecarrier a factory engaged on work of national importance in the South of England, and does a large trade in "hokey-pokey" with the munition workers.

"When the Cat's Away."

There was a notably increased number of civilian motor cycles and cars in use in South London on Friday and Saturday, probably due to the police being on strike. One of the police pickets made his journeys on a motor cycle.

Post-war Roads.

France is apparently the latest country to realise the magnitude of road transport problems after the war. *Technique Moderne* discusses the question of the best material for roads for heavy post-war automobile traffic, and the American reinforced concrete methods are given premier attention.

Pioneer Motor Cycle Magneto Inventor Summoned.

At Bromley Police Court, on September 2nd, Mr. Frederick Simms, director of the Simms Motor Units, Ltd., was summoned for unlawful use of a petrol substitute on a car at Bromley on August 15th. According to police evidence, the car was being used for shopping purposes.

Granted an "Experimental Permit."

On behalf of defendant, it was said he was the oldest motorist in England, and had driven a car since 1895 without a single conviction. In co-operation with a German he invented the magneto. In 1916 he was granted a special permit, allowing him to use the car for experimental purposes. Owing to the shortage of mica they were now trying to find substitutes for magneto, plug, and other insulators. They were also testing a new condenser and distributer. The magistrates decided there was not sufficient evidence for conviction, and dismissed the summons.

Sunday Motoring.

In the early days of rumours of petrol restrictions being imposed on British motorists, there was considerable talk of prohibiting motoring for pleasure on Sunday. On the 1st inst., the practical cessation of motoring on Sunday actually took place in the United States, in that part of the country east of the Mississippi. To assist the fuel administrator in building up a great reserve of petrol for sea and air fighters in Europe, motor car owners left their vehicles idle. They say that comparatively few motorists ignored the request, and those who did so in New York were jeered at by pedestrian spectators.

It is estimated that at least one million gallons of petrol were saved in New York alone. U.S.A. motorists are requested by the Government to observe a petrol-less Sunday until further notice. Up to the present time, the United States appear to have enjoyed motoring free of all restrictions longer than any other important country, neutral or otherwise; in fact, so far as petrol is concerned, many neutrals are worse off than the belligerents.

More Motor Cycles than Cars.

In 1916 and 1917 there were more motor cycles on the road than cars. In 1916 158,047 motor cycles were licensed and only 148,818 cars. In 1917 the figures were 122,582 motor cycles, 115,180 cars.

A New Fuel.

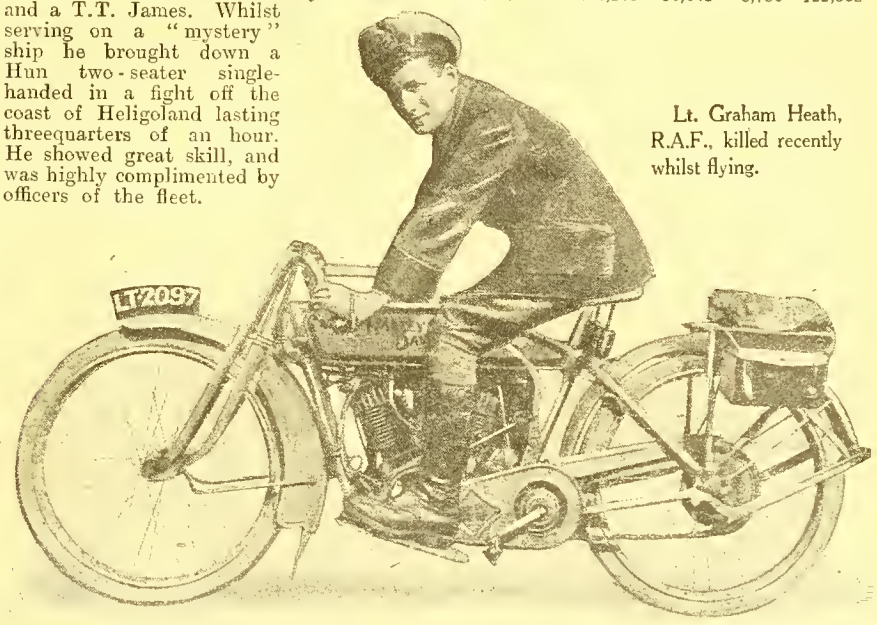
A small car is being driven about Zurich on a new fuel known as Dissons-gas, the outcome of two inventions protected by Swiss patents. The gas is generated in a specially designed producer, so it rather looks as if its use on a motor bicycle would be difficult. Experiments with Dissous-gas are being made in other countries.

The French Sidecar Ambulances.

Mr. B Peyman, vice-president of the British Ambulance Committee, writes to say that, at the request of the French Army, his committee is extending its sidecar ambulance service in the Vosges Mountains, and is urgently in need of twenty more motor cyclists—men over the age of forty-one, or Grade 2 men over thirty-five, or Grade 3 men. A knowledge of French would be of assistance, but is not absolutely necessary. The remuneration offered is £2 a week, with uniforms, rail fares, and rations free. Applications should be sent to the British Ambulance Committee's Headquarters, 23a, Bruton Street, London, W. Most of our readers will have gained a very good idea of the conditions of the work from the articles "Pro Patria" from the pen of our contributor "Chinook," who is at present engaged in this genuine war work.

Death of a Motor Cyclist Airman.

We regret to learn the death of Lt. Graham Heath, who met his death during a trial flight on August 20th. The primary cause of the disaster was engine failure. He was only eighteen years of age, and gave great promise of future achievements. An enthusiastic motor cyclist, he had at the time of his death two machines at his flying station in Scotland—a twin Harley-Davidson and a T.T. James. Whilst serving on a "mystery" ship he brought down a Hun two-seater single-handed in a fight off the coast of Heligoland lasting threequarters of an hour. He showed great skill, and was highly complimented by officers of the fleet.



Lt. Graham Heath, R.A.F., killed recently whilst flying.

Miss Mairi Chisholme Engaged.

We congratulate that gallant lady motor cyclist, Miss Mairi Chisholme, whose excellent work at Pervyse, in company with her sister, the Baroness de T'Serclaes, is well known, on her engagement to Capt. W. T. Hall, M.C., R.A.F.

The Four-cylinder Motor Cycle.

A new and most interesting "flat four" motor cycle engine design has recently been sent to us by one well qualified to speak with authority on such matters. We hope to give full particulars of the engine—the cycle part of the machine is not covered by the designer—in an early issue, but may mention now that one feature is the making of engine and gear box in one unit.

Endorsements.

It is interesting to note that at a local police court, after fining a man for unlawfully using petrol, the Stipendiary, on application by the superintendent, ruled that convictions for contravention of the Order (presumably the Motor Spirit Restriction Order) must be endorsed on the motorists' licences. This is contrary to the general construction of the Order, and some definite authoritative statement on the point is necessary.

Over 150,000 Motor Cyclists.

According to the figures given in the recently issued report of the Commissioners of Customs and Excise, 1916 was the record year for motor cycling. The number of licences issued in respect of motor cycles totalled 158,047 for 1916, of which 139,661 were issued to motor cyclists in England and Wales, 13,299 in Scotland, and 5,087 in Ireland. The figures since the year before war broke out are interesting as showing the growth of motor cycling up to the time of the petrol restrictions. We give these below :

Year ended March 31st.	England and Wales.	Scotland.	Ireland.	Total.
1913	89,551	8,233	1,962	99,746
1914	113,043	10,635	3,093	126,771
1915	126,495	12,001	4,150	142,646
1916	139,661	13,299	5,087	158,047
1917	108,203	10,643	3,736	122,582

THREE-CYC

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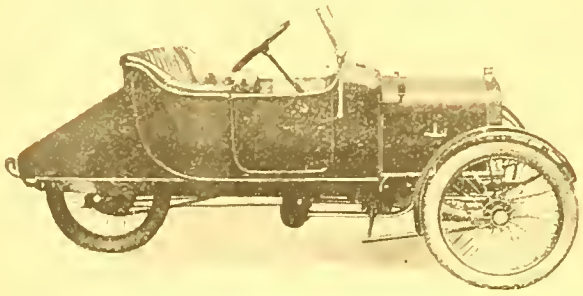
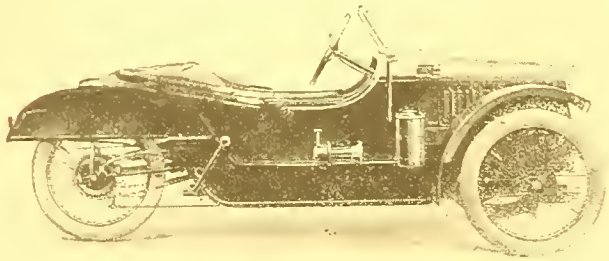


The Tyseley—a good-looking three-wheeler shown at Olympia in 1911.

THE three-wheeler may be regarded as the pioneer of the English automobile. If the history of the type were traced back to its source it would be found that most of the brains of the automotive world, at one time



The Morgan—the vehicle which has done more to popularise the three-wheeler than any other machine.

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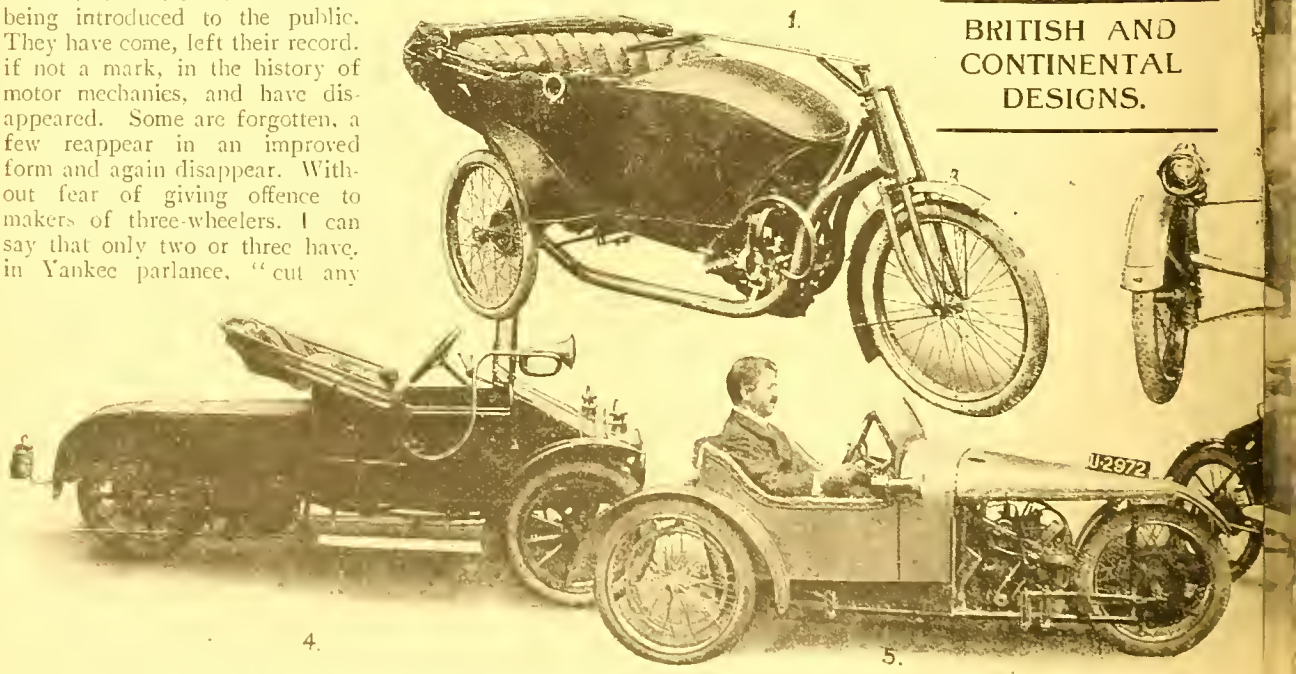

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In the third mentioned class, the Scott represents the latest development of the sidecar type of two-track vehicle, in which group come all motor cycle sidecars built integral and double-seated sidecars with the driving controls within the body, as the A.J.S., U. and I., Seal, H.S.M., etc.

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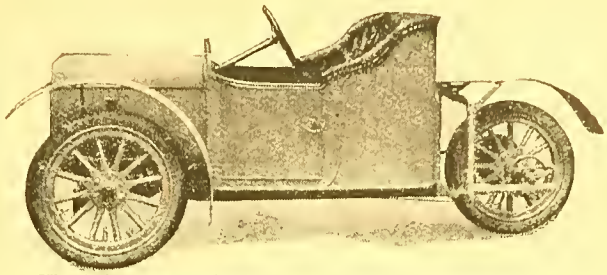

The Jackson three-wheeler, which embodied many interesting features.

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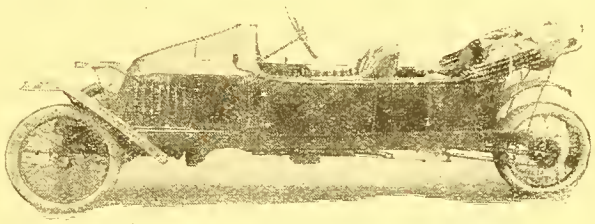

A French tandem-seated three-wheeler—the Torpelle.

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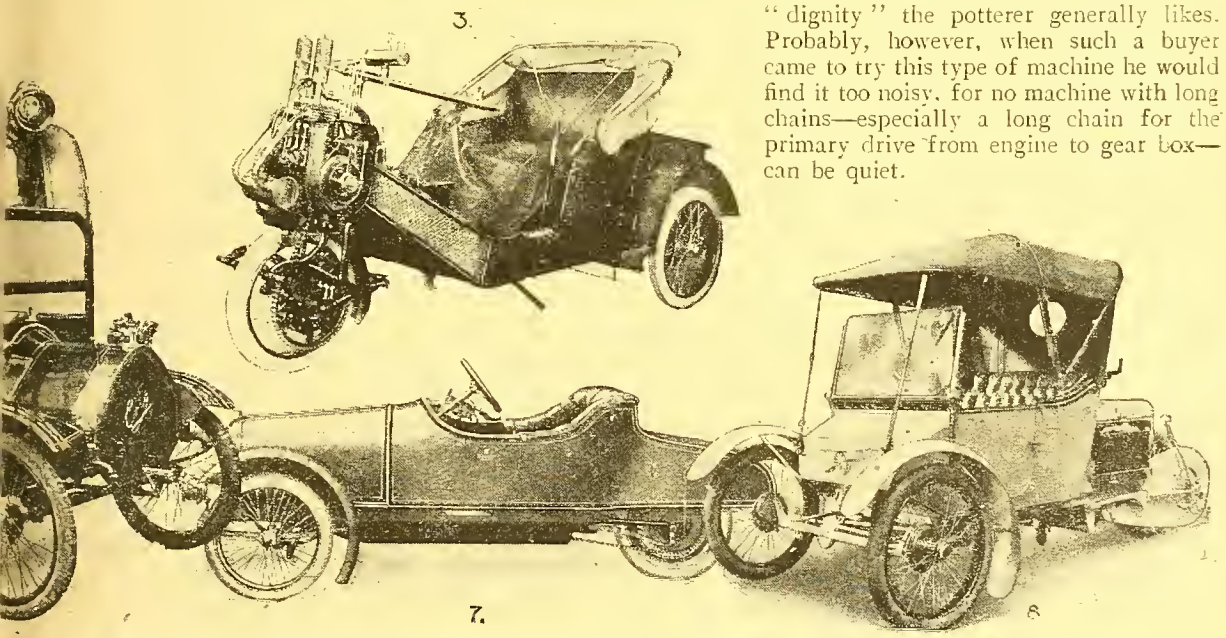

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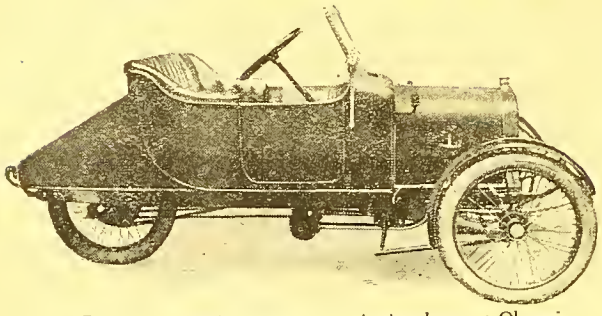

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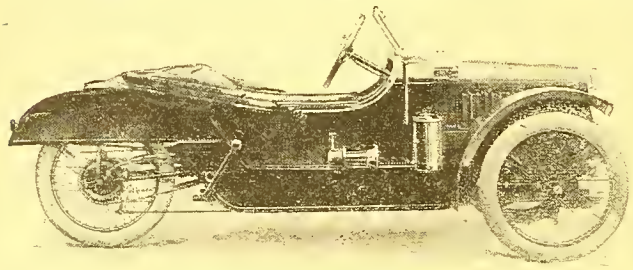

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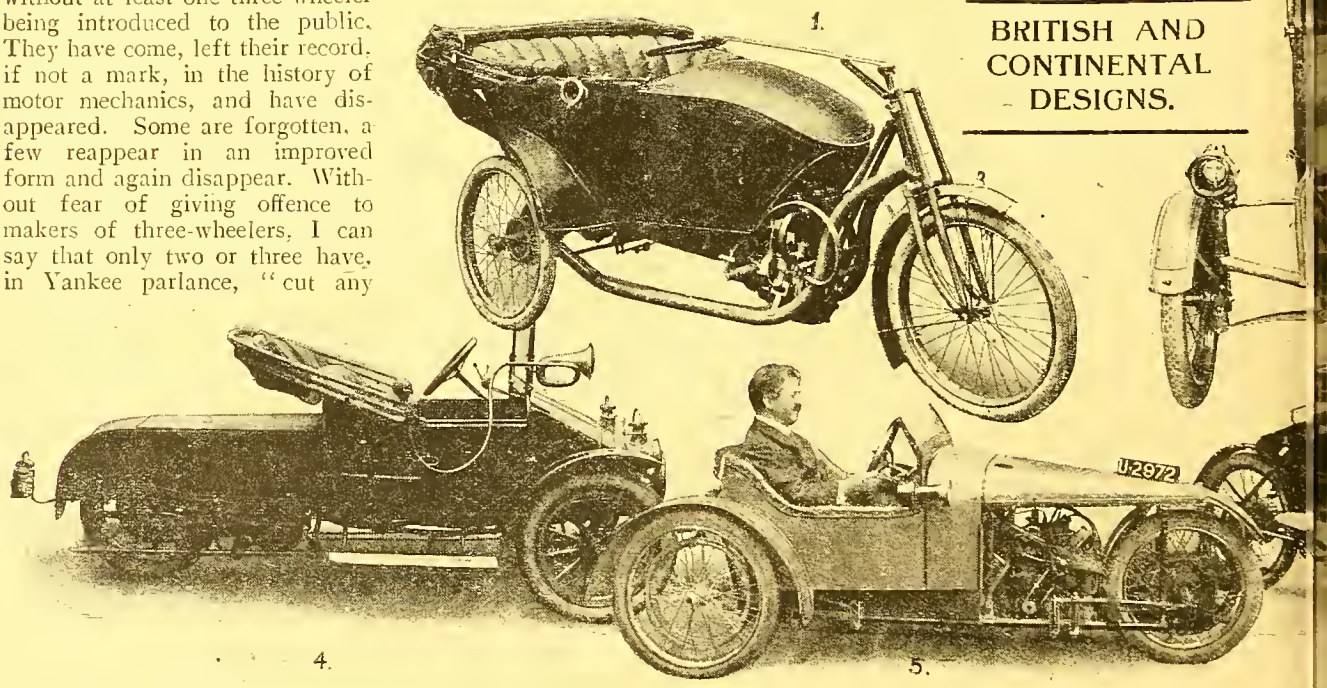

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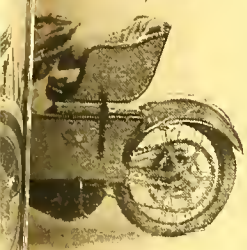

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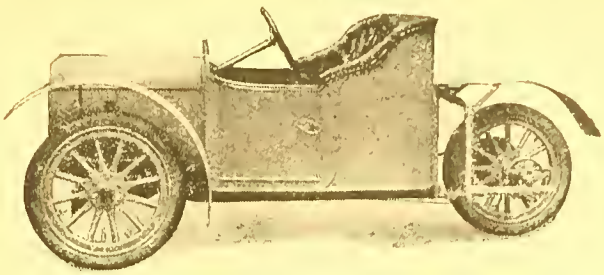

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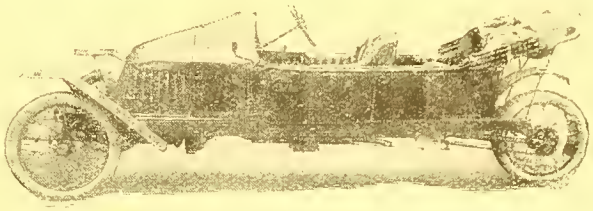

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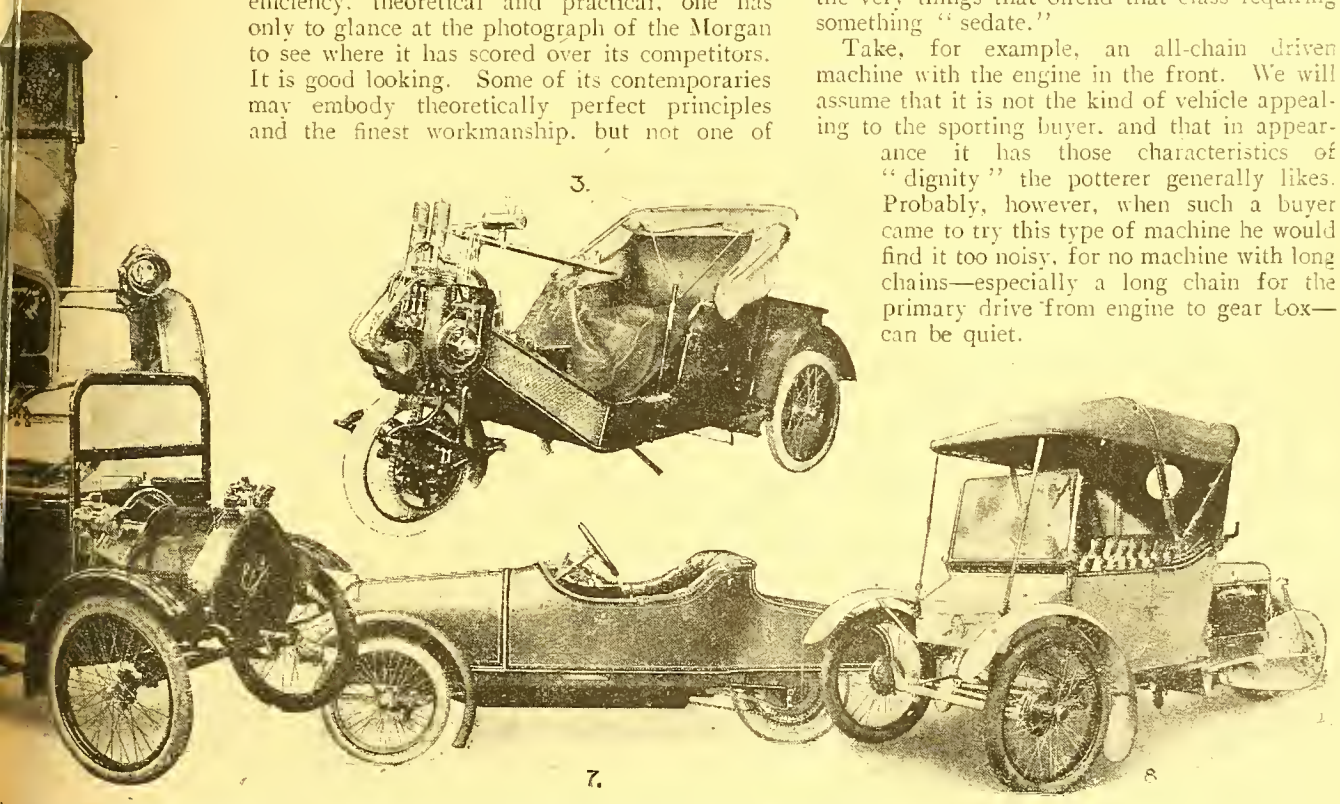

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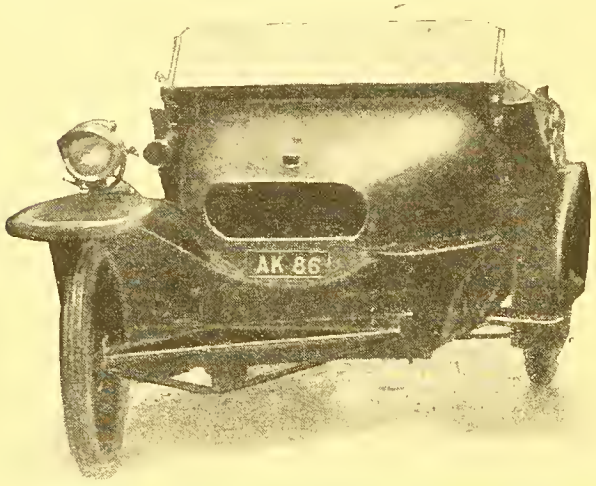
The Three-wheeler.—

The Eric, Enfield, and Crouch were not intended as sporting machines. They were designed as three-wheeled cars, and I do not think there are a hundred buyers in this country to-day who want three-wheeled



The Scott Sociable—probably the most remarkable vehicle among three-wheelers at present extant.

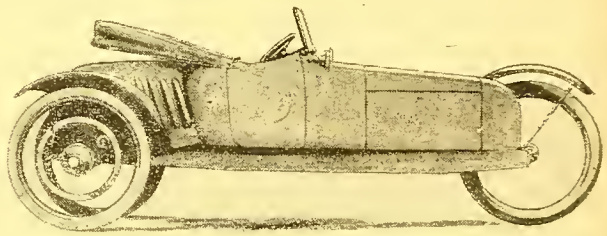
cars. When such a vehicle assumes the size and shape of the orthodox car, the absence of the fourth wheel gives it a "freakish" appearance, and the very people for whom it was designed are the first to notice this. They do not want anything tending to freakishness, they really want a Rolls-Royce for about £100, but, failing that, a Ford for £50 will satisfy their requirements.

In other words, no one has succeeded in meeting the demand which exists for an economical low-priced motor vehicle among those who so far have not motored, and designers should not overlook this vast potential market for a runabout of the right design. I am fully convinced that next to the question of mechanical reliability, appearance is the most important point to be considered.

The designer who tries to cover all classes of buyers of three-wheelers probably will fail to interest any one class. There are vast possibilities in catering for the motor cyclist who wants something as fast, as sporty, and as reliable as the best sidecar outfits. There is just as immense scope in providing for the potterer who wants something cheaper and more economical than the cheapest car. But the man who has never motored in any form of vehicle will be interested in three-wheelers only when their numbers on the road render them more "orthodox" than they are at present.

The success of the Morgan can be attributed to four points. It is smart in appearance. It in no way resembles the car, and therefore is not mistaken for an imitation or a substitute. It has been proved efficient, and it has fewer transmission noises than the majority of runabouts. This latter point is of paramount importance, and in the case of the Morgan this reasonable degree of silence is due to the primary drive being by shaft instead of by chain, as in the majority of machines designed for the same purpose.

To be a success as a commercial proposition, the three-wheeler of the immediate future must have all the good points of the Morgan plus others of its own, but nothing will be gained by the designer who over-



The Duryea three-wheeler, designed and marketed by one of the best known American motor engineers.

develops the type, because a three-wheeler must cost very little more than the sidecar combination of the same power. There will be some cheap light cars after the war, and the designer of the ultra-refined three-wheeler may find that for another five pounds he can make his proposition a four-wheeler, which will bring him in competition with small cars of the orthodox type.

VEDETTE.

Lubricating the Gear Box.

A DETAIL which will require thoughtful attention after the war is the lubrication of countershaft gear boxes. Whereas the average car gear box contains a bulk of lubricant equivalent to at least twenty times the bulk of the moving parts inside the gear box, a motor cycle gear box is so cramped for space that there is remarkably little clear space to hold lubricant. The owner can hardly ever tell how much lubricant the box contains, since the sole orifice for inspection is a hole about ¼in. in diameter, which is inconveniently situated and blocked up by a gear wheel within ⅛in. of its base. In practically every case the lubricant is awkward to insert. If oil is used the help of a funnel is desirable, and cold oil flows so sluggishly down a tiny funnel that the owner gets sick of the job before the case is full, and at best it does not hold enough for a long distance. If grease is used it exudes round the plug hole quite early in the proceedings, and gives the illusive effect that the box is full. Oil and grease guns are filthy things to handle, and are generally left at home when the machine goes on tour. A large percentage of the lubricant inserted by the trustworthy minority of owners leaks out along the countershaft bearings, where a leak is more perilous than it would be along the joints of the casing, as the user is less certain to detect it. We want walloping big inspection holes through which we can plug lubricant in lumps. Till we get them the only safe plan is to heat the oil till it runs like water, and then pour it in through a funnel till it obviously wells out at the top. After that the next precaution is to relubricate after half the mileage recommended in the makers' maintenance book.

IXION.

THE MOTOR CYCLE

AVIATION SECTION

A Technical Museum. Grit and a Good Day's Work.

Aero Museum.

A Technical Museum has been organised at Islington, comprising all types of Hun aeroplanes which have been captured. It is open only to those who have some official connection with aeroplanes.

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An Aero Lifeboat?

The latest from the States is a parachute which has been designed to salve a damaged aeroplane! The inventor is one Edward Unger, who has had a very considerable experience in the Western States as a parachutist, having made nearly a hundred drops without mishap, so it may be that this idea is not so visionary as it might appear.

—◇□◇—

A Wonderful Achievement.

A two-seater machine was engaged in special work when it was attacked by seven German machines, which surrounded it, firing at the British machine from all sides. The Germans used explosive bullets. Fighting gallantly against these crushing odds, the British pilot battled his way through the enemy formation. In the course of the fight, however, one of his legs was hit five times, so that the limb was all but severed, and fell among the controls. By a supreme effort the pilot clung grimly to consciousness, and somehow managed to disentangle his leg from the controls. Not only so, but he succeeded in landing the machine safely behind the British lines.

Result of a Rich Mixture.

A curious accident was explained at an inquest on a flying officer the other day. The officer in charge stated that the accident was due to the choking of the engine. Deceased gave the engine too much petrol as he endeavoured to effect a landing, with the consequence that he lost flying speed and crashed.

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"The Air Scout."

The Air Scout is the name of an official publication of an aeronautical camp of America. In one of the issues is a very amusing poem concerning the parade of the American troops in London. We take the liberty of extracting it:

Bobbing miles of jaunty stetsons,
Western sun-baked bronze complexions,
Rifles sloped in all directions—
Solemn-looking blokes.

Moving files of khaki knickers,
Bandoliers and rolled-up slickers,
Glinting barrels, bayonet flickers—
Solemn-looking blokes.

Lean of jaw and lithe of muscle,
Crammed with Yankee pep and bustle,
Ready for a desperate tussle—
Solemn-looking blokes.

Swinging stride in care-free manner—
Massachusetts, Indiana—
Marching 'neath your starry banner—
Solemn-looking blokes

The Death of Pegoud.

The last day of August was the anniversary of the glorious death of André Pégoud, killed in an heroic fight with a Boche aeroplane in front of Belfort. On the second anniversary of his death, last year, a monument was erected by his comrades on the point where he fell, Petite Croix, near the above-named fortress town.

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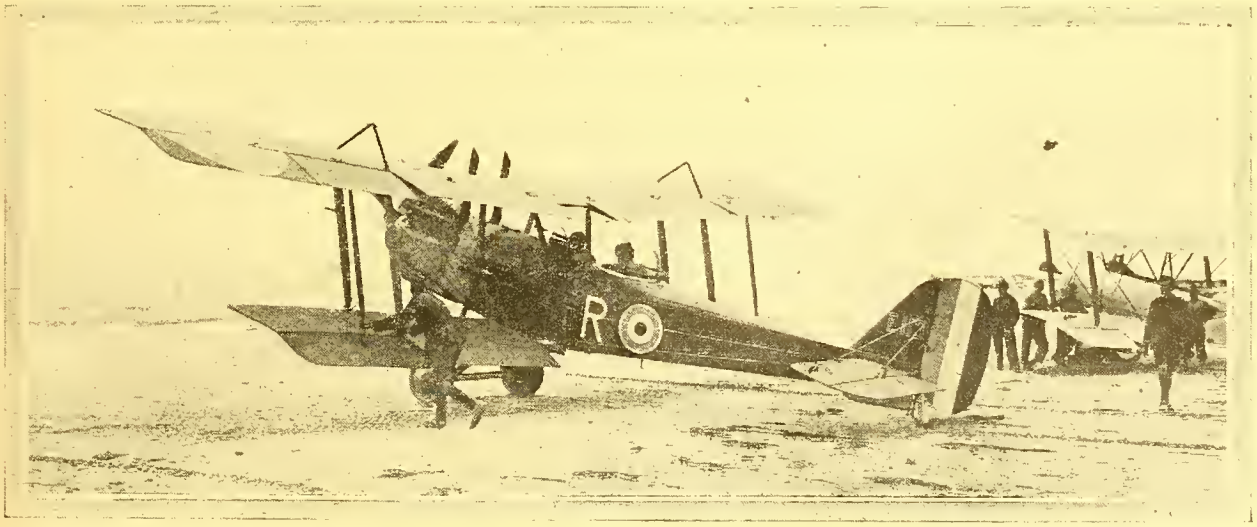
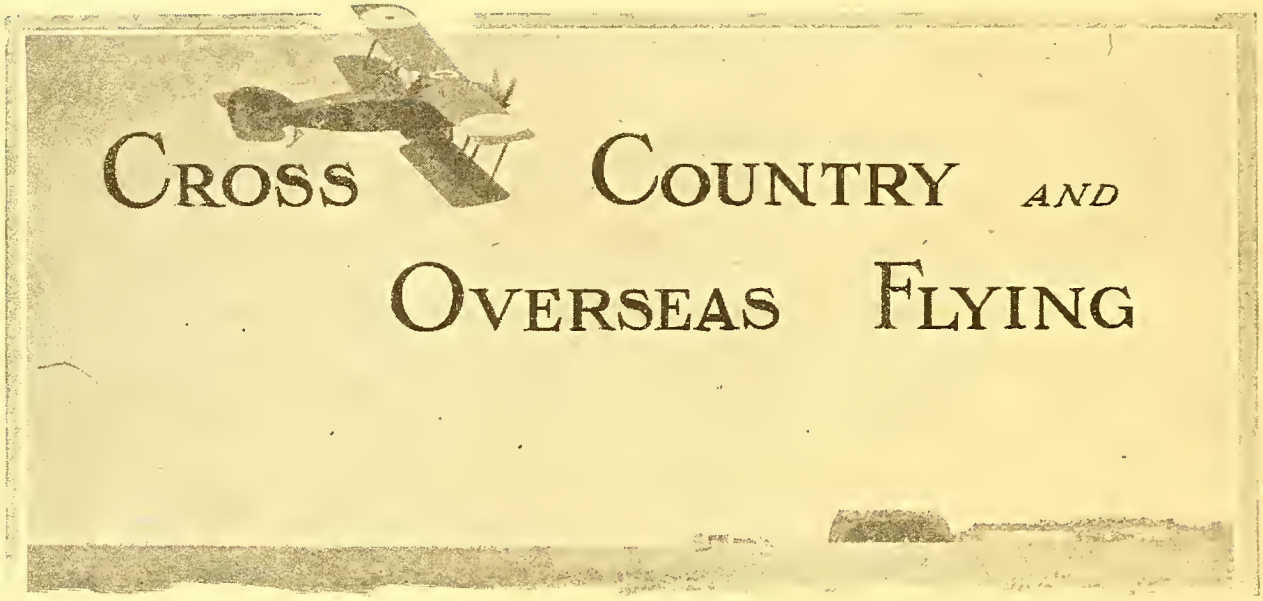
"Some Raid."

The following account is taken from the battle zone records of the R.A.F.: "A highly successful raid was carried out on a German aerodrome by combined British and American squadrons. Successive formations, flying very low, released their bombs on hangars, machines on the ground, and hutments. By this bombardment the German petrol and oil store was set on fire, which, in turn, spread to the ammunition dump; six machines on the ground were destroyed by fire, and two more by direct hits; two large Gotha and several smaller hangars were enveloped in flames, as well as some living huts of the *personnel* of the German squadrons. The Germans rushed out and desperately endeavoured to put out the flames, whereupon the raiding planes immediately swooped down again to the attack, and plied the Germans with machine gun fire, scattering panic-stricken mechanics in all directions, and laying low many of them."



An R.A.F. aeroplane in France starting on a trip over the sea.



CROSS COUNTRY AND OVERSEAS FLYING

Hints on Locating Position and the Use of the Compass.

THE secret of success in accurate navigation of an aeroplane by day is a good knowledge of topography to assist in rapidly locating positions on the map from above and an intelligent use of the compass.

A certain amount of difficulty is always experienced by pilots in making their first cross-country flights, partly because the country over which they are flying for the first time presents quite a different aspect from above and partly because they have probably not taken sufficient trouble to study their map bearings beforehand.

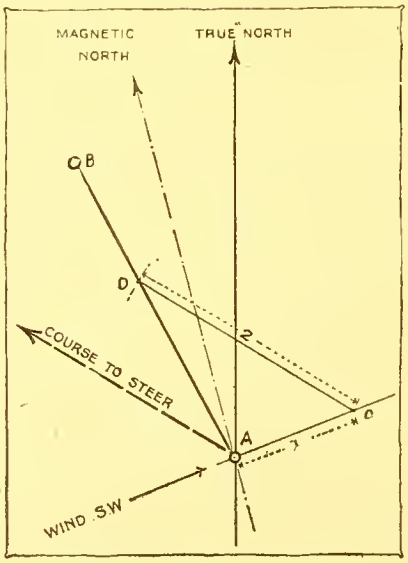
A pupil will be well advised to make a short flight at his first attempt and above all to keep well in sight of the aerodrome, and by constant practice and strict observance to details of various landmarks he will soon accustom himself to cross-country flying.

Overseas flying, which is dealt with later, is entirely different from flying over land, as the pilot is more or less solely dependent upon his compass.

A Cross-country Flight—Preparations.

MAPS.—Cross-country pilots must make a thorough study of map reading, and should make a point of using no map with a larger scale than two miles to the inch.

A pilot, having been instructed to fly to a certain place, must first map out which will be the best course to take. This is the first thing which must be done, and should be finally settled upon before attention is given to any other details. If there is no side wind blowing, a straight course from point to point is advised. The two points should be joined together on the map by an ink line and the "true" compass bearing of this course taken. To this, add or deduct, as the case may be, the variation between "true" and "magnetic" north, which is at Greenwich 15° west. This variation should be written down on a piece of stiff paper or card and pinned to the instrument board in full view of the pilot. If this is not done, the pilot, having other things to attend to, may easily forget the variation and lose his bearings. This will necessitate a forced landing to lay out his course again.



A diagram showing how a straight course can be steered from one place to another in a wind.

Should there be a side wind blowing across the course which the pilot should take, he should make a small diagram calculation on his map to ascertain how much he should allow for this wind.

This is done in the following manner: Let A be the point of departure and B the destination. Join AB. Now, from the point of departure A draw a line down wind (*i.e.*, with a S.W. wind blowing, the line should be drawn N.E. from A).

Estimate the speed of the wind at, say, 30 m.p.h. at 2,500 feet altitude and estimate the speed of the aeroplane (this speed is always known) at 60 m.p.h. This gives us a ratio of the speed of the wind to the speed of the aeroplane of 1 in 2. Now lay off one inch along the wind line from A, cutting this line at a point C. With centre C and radius two inches describe a circle to cut the line AB at a point D. Join DC. Now draw a line parallel to DC through the point A, and this will give the correct course to steer to counteract the S.W. wind

Cross Country and Oversea Flying.—

which we have estimated to be blowing at a speed of 30 m.p.h.

Before a pilot proceeds upon a cross-country flight he should thoroughly test his engine and ascertain that it is giving the correct number of revolutions. He should also examine all bracing and control wires and cables. (Note.—It is very important to watch the wear of cables where they pass over pulleys or through "fairleads.")

Landmarks.

TOWNS.—Towns afford very good landmarks, but passing directly over them should be avoided if possible. Towns to be passed *en route* should be underlined on the map.

RAILWAYS.—Railways are of great assistance, and can be followed from point to point.

ROADS as landmarks are not particularly good in England. As a general rule, they wind about considerably, and it will be found that most main roads, being macadamised, do not show up well. In France, on the other hand, roads make very efficient landmarks, as they are built straight, and can be followed with great ease.

WATER, perhaps, affords the best form of landmark to the airman. It shows up well upon the landscape, and can be seen from a great height, especially when the sun is shining brightly.

A day-bombing squadron on the Western Front in France. Mapping out a "stunt."

After much rain a pilot, however, should be careful not to overlook the fact that a flooded stream may easily be mistaken for a broad river, and a flooded meadow will give the appearance of a fair-sized lake, which is puzzling when they cannot be found on the map.

HEIGHT.—It is advisable to fly at a height of not less than 2,500 feet (clouds permitting) to avoid danger in case of a hurried forced landing.

FORCED LANDINGS.—Should a forced landing be necessary great care must be taken in selecting a good landing ground. The pilot must at least descend to 1,000 feet before attempting finally to settle upon the ground—above this height it is practically impossible to judge the nature of the ground.

The best time of the year for cross-country flying is the autumn when the crops are in. At this time the best landing ground for a pilot to select is a stubble field, which from a height presents a light brown appearance. Dark green fields should be avoided—these are generally "roots."

Having fixed upon a landing spot, the whole attention of the pilot should be directed towards that spot. He should not at the last minute endeavour to reach another field which may appear to provide better landing facilities unless, of course, this field happens to be nearer than his first choice. Always "over-estimate" a landing rather than "under-estimate." In the former case you can always do one or two "S" turns or spirals if you are over-running your mark, but in the latter case there is absolutely no remedy.

Should it be necessary to land in a ploughed field it must not be thought that this is a bad landing ground. The method of landing is as follows:

Land against the wind regardless of the direction of the furrows. When about two feet off the ground, sharply kick the rudder over in the direction of the furrows and pancake the machine. A perfect landing will be the result.

A pilot flying over the sea, whether he is in a land machine or a seaplane, is entirely dependent upon his compass, for immediately the land is left behind, light ships, buoys, shoals, and suchlike aids to aerial navigation become few and far between. For this reason, the compass on a seaplane should always be placed within easy reach and in full view of the pilot. Distance is measured by the time taken on any particular course.

DRIFTING. — To allow correctly for "drift" over the sea is one of the most difficult problems of aerial navigation.

FOG.—An attempt should never be made to fly in fog. Should a thick fog be encountered, always glide down until the surface of the water is clearly defined and then fly low.

When landing, one eye should be kept on the altimeter, and the machine should be smartly levelled up some feet above the water and then gradually brought to rest. Never attempt a fast landing, as you may unwittingly glide the machine right into the sea.

GETTING OFF THE WATER.—Always get off head to wind. Getting off a rough sea is difficult, and can only be accomplished successfully by practice.

ALIGHTING.—It is absolutely essential to alight head to wind: therefore before landing make sure which way the wind is blowing. This can be ascertained by looking at ships' flags or smoke. It is by no means an easy matter to judge a good landing on a calm sea, and pilots often glide their machines right into the water thinking that they are still fifty feet up. The best plan is to land near a buoy or alongside a ship.

Finally, remember that in a bad crash the sea is in effect as hard as the rocks, and the landing is by no means a soft one as so many people erroneously imagine.

GEO. H. BETTINSON (R.A.F.).

The Letters of Capt. Ball, V.C.

Reviewed by "Torque."

ALBERT BALL was seventeen years of age when war broke out. He immediately enlisted as a private in the Sherwood Foresters, was promoted to sergeant within a fortnight, and gazetted second-lieutenant in October, 1914. By June, 1915, he was "fed up" with home service, as the War Office was not in a hurry to send such youngsters to France; so whilst training with his regiment at Luton he got up daily at 3 a.m., rode to Hendon on his motor cycle, and took his ticket as a pilot at the Ruffi-Bauman School at Hendon, paying £75 out of his own pocket for tuition. If his work with his platoon ended in time he rode back to Hendon for another "flip" in the evening. At the end of October he secured his transfer to the R.F.C., where the service instructor presently told him "to look for a flying school for girls and join it at once." He got his "wings" on January 26th, 1915, and acted as instructor at Gosport till February 17th, 1916, when he crossed to France, landing when the Fokkers were a scourge to our pilots. He piloted an artillery observation machine (B.E.2C.) till the end of April, when Gen. Higgins picked him out for scout work. Just before he was transferred to a scout squadron he shot down his first Hun (an Albatross two-seater). In the next twelve months he shot down forty-seven Huns, and on May 7th he was trapped and outnumbered by the Richthofen circus, and was finally shot through the head by Lothar von Richthofen, younger brother of the famous baron. He was awarded the D.S.O. (two bars) and M.C. and a posthumous V.C. A war record such as few men of twenty-one can show, and pleasant reading during a munition strike.

* * * * * *

The book which bears his name consists very largely of padding, many pages being occupied with press and other tributes. A thin trickle of extracts from his charming letters meanders through stuff which would have been better omitted. The letters are the artless gossip of a boy—naive and brief descriptions of his life in the simplest language and the shortest sentences, touching on every sort of topic: his garden, his bath, his church-going, and his battles. Ball never grew up. Though it was his fate to become the most formidable airman of the war, he hated killing: soldiering was never his *métier*, though he excelled in it. Everybody who reads the book will fall in love with Ball, a typical English schoolboy: everybody will wonder that it contains no explanation of his genius as a fighting pilot.

His Intuition.

His greatness was based on two qualities which every pilot who wishes to survive must possess, but existed in Ball to a phenomenal degree. One is simply explained. He had a perfect eye. He was a dead shot, and it was next to impossible to take him unawares. The second quality is less obvious. In every man there is a period of delay between the moment when the perceptive nerve of the eye or the ear conveys information of fresh circumstances to the brain, and the moment when a motor centre of the brain orders the hand to take some action in response. This delay increases with age; for this reason the fighting pilot must be a youngster, since lightning decision is the essence of his game. Ball was miraculously quick. A perfect eye and a power of instantaneous decision were the foundations of his triumph. To them a third factor must be added. The diaries of most flying men indicate that they gradually improved their control of their machines and that experience taught them tactics. It is commonly stated that Ball was never a superfine pilot in the sense that the term might be used of a star stunt-merchant, nor is there any trace in his letters of slowly maturing tactics. I think he was a born tactician. Just as some gamekeepers seem to understand from childhood the ways of the wild creatures among which their lot is cast, so Ball divined by instinct what his enemies were doing or likely to do, and knew without thinking how to counter each move they made. He was an intuitive rather than a calculating fighter, a natural genius rather than a product of the schools.

He lived as we could all wish to live. He died as any man might be proud to die.

THE ALL-METAL AEROPLANE.

DESIGNERS and pilots, bursting with pride in their latest 'bus and its performances, are loth to believe that the *dernier cri* of 1918 may excite ridicule rather than interest when it is staged in a museum by 1925 or so. It is probably true that the aeroplane has already passed out of the "bone-shaker" stage, but it is certain that the machines of 1925 will be profoundly different from current examples. After a lively patrol a scout aeroplane often requires more retuning than its engine. Every bracing wire must be retensioned. Bullet holes in the fabric and woodwork demand attention. The surfaces are mostly at false angles of incidence. A wood, linen, and wire construction is excellent under war conditions. Patches can be doped on to injured fabric. Wooden members can be rapidly replaced by spares. The current type of structure lends itself to swift repair, just as it is admirably adapted for mass production by diluted labour. When peace returns, quick repair and the utilisation of a large percentage of unskilled labour will be less vital. The all-metal aeroplane with a tubular skeleton, brazed joints, and sheet metal wing coverings will not require a squad of niggers after each journey. Our big cycle factories can readily be adapted for its manufacture. It is quite on the cards that all-metal aeroplanes will be prominent in "performance" competitions as soon as peace is declared. They can dispense with bracing wires. We have all been told that the substitution of streamlined for circular bracing wires puts up the speed of a given 'bus quite appreciably by reducing the passive drag. The complete abolition of bracing wires would obviously lead to a marked increase of speed.

WHERE FLYING MEN ARE FITTED OUT

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is still allowed. In matters sartorial the R.A.F. is in a transitional state, and opinions are divided on the merits of the new blue. There may be further changes before the final decision. Meantime it is well to be on the safe side by adhering to the old pattern. For one thing, there need be no waiting, as supplies are ample.

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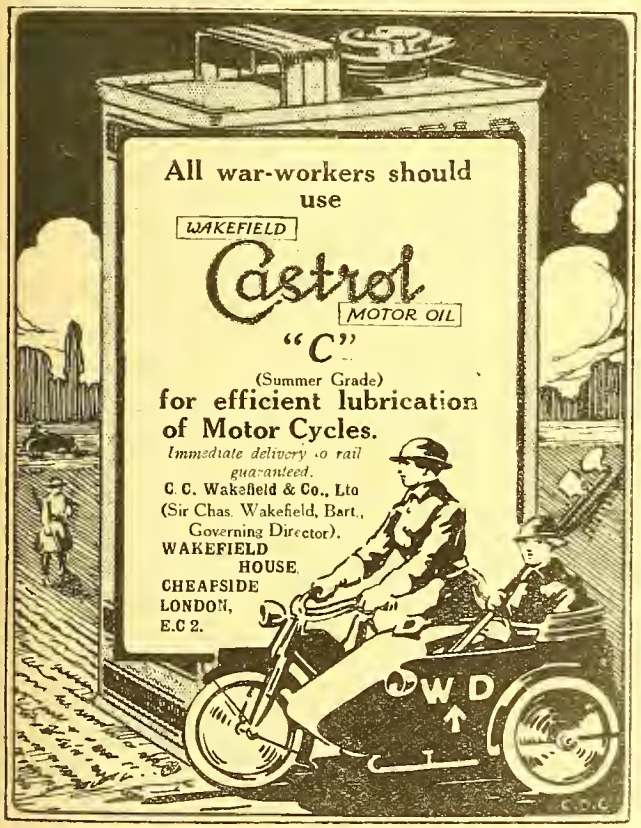

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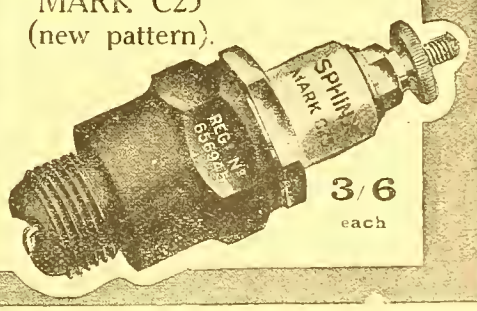

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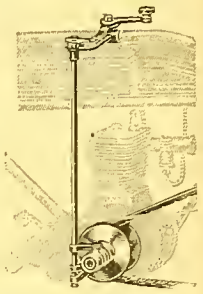

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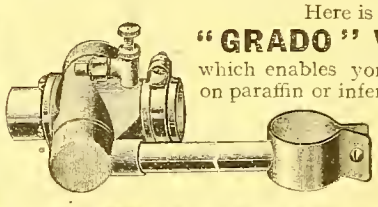

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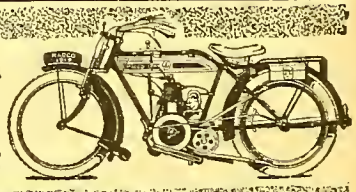

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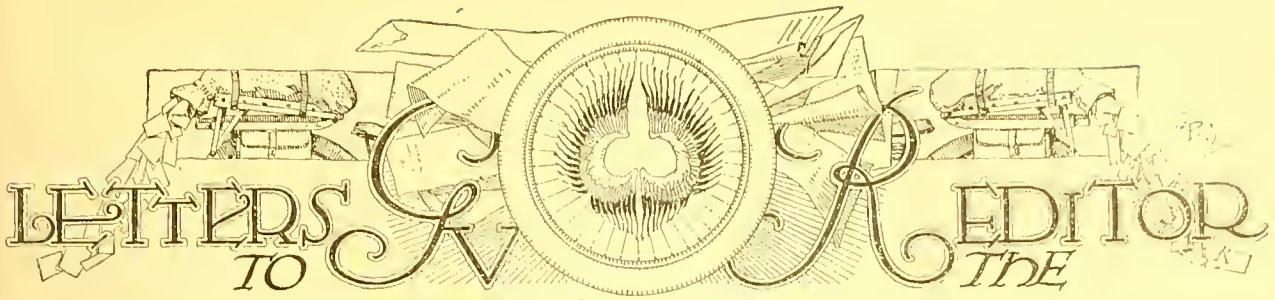


The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

THE DURATION RECORD.

Sir,—With reference to H. Gilbert's letter in your issue for the 5th inst., the final paragraph does not appear to be quite correct.

I believe I am right in stating that the duration record there referred to is still held by the Sopwith machine fitted with A.B.C. engine, with a flight of 8h. 23m. non-stop, the flight by Raynham on the Avro for the same record only reaching just over seven and a half hours.

F. SIMPSON.

STEAM CYCLE CARS.

Sir,—I have noticed of late a revival of interest in cycle cars. Now many people are at present turning their attention to steam cycles, but the housing of the "boiler" seems a difficult problem.

May I suggest that a steam cycle car might be an extremely useful proposition. The engine and boiler, etc., could be conveniently slung in the rear of the chassis, and would not in any way interfere with the seating accommodation. For fear of trespassing upon your space I refrain from giving more than a bare idea of my scheme, but I feel confident there are many possibilities in steam, and that this would be a quite promising direction for early experiments.

(Rev.) T. BAYDEN SINGLETON.

MACHINE FOR DISABLED RIDER.

Sir,—I see in *The Motor Cycle* of September 5th (page 227) an enquiry from a disabled officer with reference to a suitable machine for a rider minus a right leg. I should just like to point out that it is perfectly easy to give a sufficiently strong kick to the ordinary kick starter while standing on the false leg. It may seem rather strange when one tries it first, but with a little practice it is as easy as "drinking tea." I rode my machine (a Norton) for several months before having my artificial limb fitted even, and after a try or two never had the least trouble in starting my machine, even when stone cold.

I have no interest whatever in Messrs. Nortons, other than that of an extremely satisfied user, but for anyone who is minus a right leg I know of no more suitable machine—brake on the left, handle-bar clutch control, and, of course, hand gear change for the Sturmey-Archer. It is a simple, reliable, no-trouble machine; not too weighty to handle easily. There is no question that it is best to have a sidecar fitted always. A machine could be ridden without, of course, but there would be a great risk of perhaps serious injury in the event of a skid or even light fall on to the side of the artificial limb.

B. JEFFERYS.

THE THREE-JET BINKS CARBURETTER.

Sir,—I was very interested in Dr. Lindsay's article on the Binks three-jet—the carburetter I have fitted to my 4 h.p. Bradbury and sidecar. I have only been discharged from the Army a few weeks, and what little experience I had with the three-jet before joining up is forgotten, and I have to learn over again. Needless to say, also, the outfit is used on business only, with little chance to experiment. The extra "half-phase," as Dr. Lindsay aptly describes it, is most decidedly evident, and until recently I was quite baffled by it. In opening out on an incline, when the lever reached the "dead spot" the engine started to misfire, and, in fear of "konking out" on the up grade, I always pulled the lever back and changed gear. The jets have been out several times, only to find all three quite clear, and yet I could only think that in some way the main jet failed to draw its supply in some way. Quite recently, when ascending a stiffish hill, I tried (rather fearfully, I must say) opening out well over the spot where the difficulty appeared to be. I was simply astonished at the acceleration. I sailed gaily up the incline, leaving my difficulty and doubt behind, and have had no trouble since.

It seems strange that the makers give no warning of this peculiarity in their instructions, and I thank Dr. Lindsay for his article

EDGAR E. BASEVI.

Sir,—Referring to the article on my carburetters by Dr. Alexander Lindsay, in *The Motor Cycle* of August 29th, I am sure I am much obliged to the doctor for his kind remarks about my instruments, and would like to try and explain the dead point, or dead spot, to which he refers.

I have received more than 10,000 testimonials from all classes of users, and occasionally I get a letter from someone who complains of the dead spot. In all these cases where the letter has come under my personal notice, I have asked the user to send the carburetter back to me for examination, and I have invariably found a reason for the dead spot. Now, the design of this carburetter does not admit any dead spot, and I can truthfully say that it is only a very small proportion of carburetters that show this dead spot, and this, I have found, is caused by the mixture, which at this particular point is too rich or too poor. A dead spot is invariably caused when either of these two conditions prevail.

Now, Dr. Lindsay says that the dead spot in his carburetter is just when he is coming on to the main jet, and that in this case Dr. Lindsay attributes the dead spot to over-richness, and I make no doubt that he is quite correct in his diagnosis, and the reason I should say is that the damper has lifted off the main jet *before* the main choke tube begins to uncover, pointing to a defect in the instrument. The chamber in which the jet damper works has evidently not been bored deep enough, and consequently the damper has lifted off the jet before the throttle was at the correct opening. In other cases where a dead spot has been found, it has been because the mixture has been too weak, and in this case the chamber in which the jet damper works has been bored too deeply. The effect of this would be that the choke tube would open before the jet was undamped. In this carburetter it is intended that the jets should become undamped simultaneously with the respective choke tubes being uncovered. When this carburetter is correctly made, no dead spot should be possible. I have tried hundreds of these carburetters personally, and am quite sure it is possible to obtain absolutely gradual increase of speed from the slowest to the highest without any suspicion of a dead spot, and that during the whole range of this gradual increase the slightest opening of the extra air lever causes the machine to ease up, showing that the mixture is perfectly correct throughout. The deduction to be drawn from all this is that when the carburetter is correctly made there is no dead spot.

These carburetters are all made to limit gauges with very narrow tolerances of error, but, as everyone knows, mistakes are apt to take place, and it is a mistake of this kind which, in my opinion, causes the dead spot.

I am quite sure that if Dr. Lindsay could visit our works I could, in a very short time, correct the error in his carburetter, which would eliminate the dead spot.

C. BINKS.

BRITISH MAGNETOS.

Sir,—Some time ago I bought a second-hand Dalm two-stroke, which had an E.I.C. magneto that was slightly out of tune, so I wrote to the E.I.C. Co. to ask them if they would overhaul it. In reply they said that if I would send it straightaway they would return it in four days. So I packed it off, and, to my surprise, at the end of four days (sharp work these times) I received a brand new magneto with a letter saying that the magneto I had sent was one they had turned out at a time when the difficulty in obtaining tools and material was very great, with the result that magnetos turned out were not entirely to their satisfaction, and that they would replace mine with a new one free of charge.

I think such generous treatment as this should be made as public as possible, as whatever guarantee there was with the magneto surely did not apply to me, as I had bought the machine second-hand. C. GAUNT.

HOW IS IT DONE?

Sir,—I, too, should like to know. Take my case, for instance I have used for the past eighteen to twenty years a motor tricycle, also motor bicycle and sidecar in my business. I also failed, after applying times out of number, to obtain a permit.

It is as Mr. Hubbard says. Germans, also people who have no legal right whatever to the use of petrol, seem to be able to get these permits. After vainly endeavouring to get a permit, I invoked the assistance of the secretary of the A.C.U., with no better result.

My idea is this. When a person makes an application the Petrol Committee should get information from the local police as to the *bona-fides* of the applicant, and so obtain information first hand, as I know of cases where people only ride five miles into a town and back, and also who have bought machines since the war. This class seem to be able to get permits when others cannot. W. E. HUDSON.

PETROL FOR MUNITION WORKERS.

Sir,—Having regard to your recent references respecting the National Motor Cyclists' Fuel Union, I would like to draw your attention to a disgusting letter sent to one of our members at Coventry, a copy of which I have enclosed.

I agree with you, sir, that it is exceedingly unfortunate that the recent concessions regarding holiday permits granted to munition workers and miners could not be granted to others, but, in defence of our Union, let me assure your readers that in whatever way the N.M.C.F.U. has obtained preferential treatment for its members we are not out to demand or to fight for any cause other than the interests of the whole of the motor cycling community. The present circumstances are so acute as to render a more general permission to all and sundry for the unrestricted use of petrol and substitute impossible, but the Union is going to use the whole of its powers to bring about such an event, not only for munition workers but everyone when the petrol situation is easier. The present time is, however, not ripe.

But we see no reason why this recent concession should be the means of causing so much antagonism similar to that which the letter I have sent you contains, and I consider that the writers should be exposed in your columns for the slanderous statements they make, and whatever union exists it is time that we munition workers should be protected, whether our recent concessions are fair or otherwise.

J. J. MOORE,
Local Secretary London Section N.M.C.F.U.

[The letter to which our correspondent refers is as follows: "On no account should we supply anyone connected with munitions from such a traitorous place as Coventry now is with petrol. We don't want any such scamps in our part of the world." This, apparently, is written more with reference to the recent strike in Coventry than with any hostility to the N.M.C.F.U.—ED.]

HAIRPIN BENDS.

Sir,—I see in your number for June 20th that Mr. E. J. Davies mentions a certain zigzag on a road out here. I will admit that this hill is a perfect beast of a hill, but I think that another one, about a dozen miles from the one mentioned, and on the same road, is infinitely worse as regards hairpin bends. This hill has, so far as I can remember, about eight or nine bends. The distance in a straight line is about a mile, and the rise is about 1,000ft to 1,500ft. The rise on the first hill is between 1,500ft. and 2,000ft.

Good wishes to the "Blue 'Un," ever the best paper.
Palestine. THE MULE.

PETROL FOR SOLDIERS ON LEAVE.

Sir,—Being a regular reader of your excellent paper, I have often seen complaints regarding the method of issue of permits to soldiers or sailors on leave, also the great loss of time when the application is made by post. I am on one of His Majesty's ships at present under repair. I obtained a substantial leave, and applied for a permit three weeks ago. Six days later I received a form from the Petrol Control Department, which had to be sent back again, accompanied by a P.O. for one shilling to cover tax on two gallons of petrol. This I did, and four days afterwards I was in possession of the permit and licence, with two days of my leave left to me, one of which I must spend in returning to my ship.

Now I contend that the permit could have been sent along with the form, requesting that one shilling be sent, and this would have enabled me to use what spirit I had on hand and a delay of four days avoided.

I trust, sir, that you will point this out to the powers that be, and thus save many of your readers the loss of many happy hours. R. THOMPSON.

A tank and infantry attack in France. Note the "peaceful" contour of the trees in the background.

QUESTIONS AND REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Removing a Ball Bearing.

Please let me know how to remove the ball bearing from the crank case of a 1910 3½ h.p. Triumph motor cycle.—J.C.

You ought to be able to get the ball bearing from the crank case by carefully heating the crank case close round the bearing in a gas flame, and then knocking it out with a hard piece of wood and a hammer.

No Compression.

(1.) I have fitted new rings to the pistons of my 4 h.p. Douglas, and now I can hardly turn the engine over it is so stiff, and there seems to be no compression, but a dragging feeling. The rings are the right size. (2.) I bought new valve springs, supposed to be for a Douglas. The four seem to be the same tension. Will they do?—S.D.

(1.) We should recommend you to lubricate the engine freely and attempt to run it with the new rings. After this we think you will find that the compression will return, and that the engine will be free. (2.) Yes, the valve springs should be satisfactory.

Petrol and a New Machine.

Please tell me if I can get a petrol permit to drive my machine from the garage where I purchased it to my home, four miles distant. Would it be necessary for me to take out the local taxation licence for this one trip?—C.F.

Yes; probably a permit could be obtained for this purpose by applying to the Petrol Controller's Department, 19, Berkeley Street, London, W.1. If you have any motor spirit by you, purchased under a motor spirit licence, you can apply to your local chief of police for permission to drive the machine home. See page 6, Section 9, of the Motor Spirit (Consolidation) and Gas Restriction Order, 1918: "Nothing shall prevent the use of petrol obtained under a motor spirit licence for the purpose of driving a motor vehicle for a distance not exceeding twenty miles in connection with the *bonâ-fide* sale or intended sale, provided the seller has obtained the permission of the superintendent or other chief officer of police in the district in which the vehicle is kept." Legally speaking, you would be responsible for taking out a local taxation licence, but it is hardly likely that the authorities would press the point under the circumstances.

Cleaning off Rust.

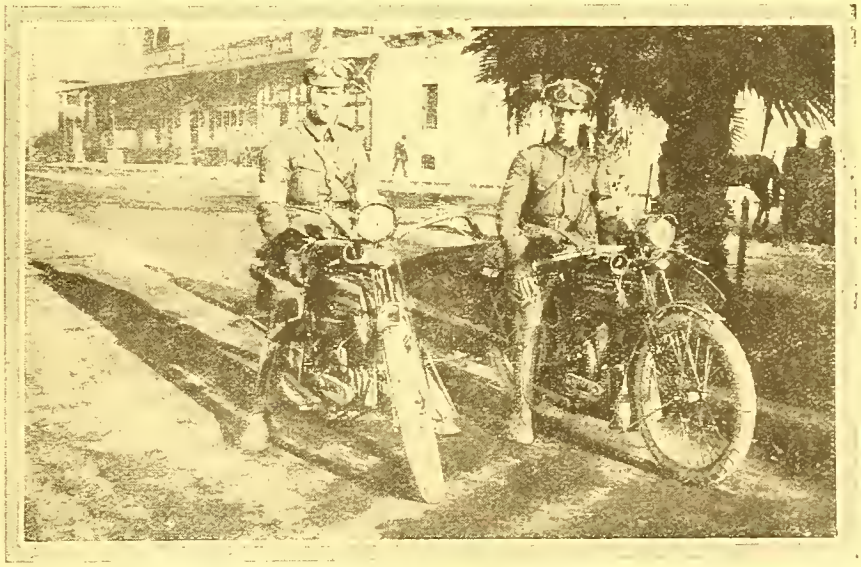
(1.) In overhauling my sidecar outfit, I spent considerable time in removing the rust, with emery cloth, from the ironwork before enamelling it, but I find it impossible to remove all traces of it completely where the rust has eaten in and pitted the metal; and these pit marks, when enamelled over, cause small blisters to appear very quickly, due, I suppose, to the minute specks of rust at the bottom of the pit marks continuing to eat away the metal underneath the enamel. Is there any better method of removing the rust? (2.) I find on the sidecar body that the woodwork on the top part of the toe is covered with red linen. What is the object of this, and how can I remove the old paint from the linen, or would it be preferable to remove the old linen and re-cover with new (glued on), although I do not see why the paint should not be put directly on the woodwork the same as on the rest of the body? (3.) Is the gold lining usually done with gold paint or gold leaf?—A.H.H.

(1.) Having removed the rust with emery cloth, treat the places where the rust has eaten into the metal by brushing them with a file card. This will have the effect of clearing the rust from the holes, and the trouble of which you complain will not recur. (2.) We are sorry to say we do not know why there is red linen over the woodwork of a portion of the body. You cannot remove the paint from this, but you will have to strip it off altogether and re-cover with new or paint the woodwork directly. (3.) Gold lining may be done either by painting or applying gold leaf. The former process is best for an amateur.

Lubrication.

The dust cap for the Senspray carburetter is missing from my Villiers two-stroke, and I should be much obliged if you would kindly tell me: (1.) What effect this would have on the running of the engine. (2.) Whether there should be any oil in the crank case of this engine (1915, simple drip). (3.) How to remove the rocker arm of the Thomson-Bennett magneto in order to ease the fibre bush.—R.R.M.

(1.) Dust will probably stop up the small choke tube. (2.) Yes. Adjust feed to give about thirty-five drops per minute. The exhaust should have a faint blue tinge. (3.) Remove the contact breaker by taking out the central hexagon-headed bolt. Detach the long spring by unscrewing the small screw that attaches it to the fixed block, then slide the small spring aside and take out the screw, which is thus uncovered.



D.R's aboard Triumphs at a base signal office in Egypt

Speed.

As I have never yet been able to exceed 40 m.p.h. solo on my 4¼ h.p. B.S.A., sidecar model, I should be glad to hear of what, in your opinion, this model should be capable when ridden *(a)* solo, *(b)* with sidecar and passenger. What could be done to increase the speed, and what would be the approximate cost? The machine has otherwise given every satisfaction.—C.R.T.

The question of speed depends upon the gearing of your machine. If it is geared correctly for sidecar work, say 5¼ to 1, it would be unreasonable to expect more than 45 m.p.h. solo, while you might manage to get very near this, say 43, with a sidecar. Raising the gear might give you a slight increase in the speed, but this would very much detract from the general efficiency of the machine as a sidecar mount. On the other hand, we have known B.S.A.'s on which 60 m.p.h. were possible. We cannot give you any idea at all of the cost of making the necessary alterations, as costs of everything are such a very uncertain quantity at the present time.

Knocking.

I have a 1915 Rover standard combination, and should be glad if you would answer me the following queries: (1.) I am troubled with knocking on picking up round corners and on opening the throttle to approach a hill. As soon as I open the air sufficiently for the engine to start pulling, it knocks. It will take very little air; the jet is a B. and B. No. 35. The engine has been taken down, and is quite clean, and bearings and rings are perfect. The top gear is 4⅝ to 1. Is this too high? There is plenty of power in the engine once I get it "revving," but I cannot do this without a knock when picking up. The sidecar is a standard Rover coachbuilt, and the weight of passenger and driver is 21 stone. (2.) The hub gear is a Sturmey-Archer, and works perfectly. What oil should I give it (through the two lubricators provided) and how often? (3.) The engine is easier to start in high gear. Does it damage the gear to change into low, with the machine stationary, before I engage the clutch. (4.) What preparation is best for cleaning the coachbuilt body, and what for cleaning and preserving the upholstery.—E.H.G.

(1.) In the first place, it appears that the jet is rather too small, and there is no doubt whatever that the top gear ratio is too high for sidecar work. It should be about 5½ to 1. (2.) Use fairly thin oil, and lubricate, say, once every 500 miles. (3.) We are not quite sure what you mean by this question. If you mean that you start by pushing off on high gear, then get on the machine, declutch, and change down to low, you can do no harm. (4.) An excellent preparation for cleaning coachwork is sold by the County Chemical Co., Chemico Works, Bradford Street, Birmingham, which can be obtained from most accessory dealers. There is no special preparation for preserving the upholstery; all you need do is to keep this clean.

Sidecar Chassis as a Check on Skidding.

I have a 1917 2¾ h.p. Douglas, three-speed gear, kick starter, with clutch. I have injured both my arms through accidents. I use my motor cycle on duty over very rough roads and lanes, and get on all right in the summer over dry roads, but in the winter the roads are very wet and cut up, and I do not think I could manage solo. Would it not be much safer to have a light chassis put on (with no sidecar) to prevent skidding? Would it be liable to upset on very rough ground and when rounding corners?—D.J.W.E.

A light sidecar chassis without body should prove of some assistance to you. It will be necessary to exercise considerable care in turning left-hand corners, but over normally bad roads the presence of the sidecar frame will make no serious difference, except that you will have to ride a little more slowly. The chassis, of course, will mitigate very strongly against the probability of skidding.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

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Starting after an Overhaul.

I have a 4 h.p. Zenith-Gradna, J.A.P. engine, Bosch magneto, and B. and B. carburetter. It always runs perfectly well, and climbs any hill. About three weeks ago I took it to pieces, had the parts replated, and cleaned the engine out. On putting it together again I had great trouble in starting it; I pushed it half a mile without its showing any signs of life. I stopped to get my wind back, then I tried again. I only ran about four yards when the engine started. I jumped on and drove about two miles, and opened out to 30 m.p.h. Then I shut off and stopped. I only stopped about two minutes, and when I went to start up again the same trouble presented itself. After dinner I tried again, when the engine was stone cold. I only ran a few yards without altering anything, when the engine started as before. Will you tell me why the engine will not start when hot? I could not get any thick oil, so I put some thin oil in the crank case. Would that have made any difference?—F.M.

The trouble is probably due to air leaks at the carburetter or induction pipe unions, caused by your not having taken sufficient care to tighten up these unions when reassembling the engine. It is rather difficult to say why the engine will not start when it is warm. This may be due to condensation on the plug points. Thin oil is not good as a rule for air-cooled engines, and you may have trouble if you continue to use it.

Gears and Sparking Plugs.

I have a 3½ h.p. Premier bination, I think a 1915 pa It has a two-speed gear box one clutch or gear is missin it safe to run on one onl have now put on an aero plug. W be any advantage for me to run on the plugs always?—E.B.

You do not say whether the clutch i of action, or if you have only one working. Starting off on the top g liable to strain the whole transm system, and perhaps break the cha belt. Running on the lower gear will cause overheating and exc petrol and oil consumption, and pe burn out a valve or plug. It shoul be very difficult to have the gear repaired. You will get a better spa running on the aero plug over the valve only after starting up.

Removing a Pulley.

I have a 3½ h.p. 1911 Triu on which the inner flange o engine belt pulley has br The outer flange is easil moved, but I have foun impossible to remove the inner (1.) Would you kindly let me if this can be screwed off, and, i in what manner? (2.) For the nine months my machine has unable to climb any fairly stiff without knocking. All carbon de has been cleaned off, and new p rings and valve springs have fitted, yet the knocking remains. haps you can assist me in gettir the root of the trouble.—J.P.H.

(1.) We presume that the pulley i adjustable one. If this is the cas inner flange is keyed on to the en shaft, and should be easily rem either by driving in three hard wedges, placed at equal intervals tween the pulley and the crank case knocking each one in turn, or, l still, by means of a pulley drawer. This may be due to the use o unsuitable plug, the points of v probably become incandescent and pre-ignition. We should recommend also to check the magneto timing.

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Fulham, Wandsworth Bridge, con down Trinity Road, Tooting Bec over Tooting Common into the Strea main road, which leads direct to don, then continue through Pu Caterham, Godstone, Blindley H East Grinstead, Forest Row, W Cross, Uckfield, East Hoathly, E bridge, Ninfield, Bexhill.

MOTOR CYCLES FOR SALE.

Calthorpe.

CALTHORPE-J.A.P., 2½h.p., 2-speed, clutch, Lucas horn, almost new condition, 30 gns.; Calthorpe Junior, 2-speed, horn, and rear lamp, as new, 20 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London [X7813

Campion.

CAMPION-J.A.P., 4h.p., 2-speed countershaft clutch, hand start, all chain, Lucas horn, excellent condition, £38 10; with sidecar, £42; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7812

Chater-Peugeot.

7 h.p. Chater-Peugeot and sidecar, engine overhauled; £15, or offer; appointment.—73, Mitcham Rd., Tooting [7983

Clyno.

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London [X7814

CLYNO, 1915, 2-speed, 2-stroke, clutch, complete, but needs overhaul; offers over £15.—47, Hamilton Rd., Reading. [7994

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37 10; E.P. or exchange.—Service Co., 292, High Holborn, London. [7910

CUFT.—Connaught, late 1916, perfect in every detail, 120 m.p.g. of petrol, 35-40 m.p.h.; sacrifice 19 gns.; wanted, combination.—Carter, 11, Newport St., Swindon. [8005

Coventry Eagle.

RIDER TROWARD and Co., 31, High St., Hampstead.—Coventry Eagle, 1916, 2-speed, 2-stroke; 29 gns. [8030

1918 Coventry Eagle, 2½h.p., 2-speed gear, only ridden twice, beautiful machine; £35.—136, Lavenham Rd., Southfields, S.W.18. [8025

Dalm.

3h.p. Dalm, 2-stroke, T.T. bars, dropped back frame, all in good condition; £16.—11, Edith Av., St. Blaydon. [X7717

De Dion.

DE DION, 2¾h.p., Palmer and Dunlop, 26in. wheels, mag. ignition, low frame, perfect order; bargain, £9 10.—2, Appian Rd., Roman Rd., Old Ford. [7984

Douglas.

DOUGLAS.—Prompt delivery to those on work of National importance.—Gibb, Gloucester. [4749

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

1916 2¾h.p. Colonial Model Douglas, 3-speed gear, in good condition; £45.—156, Lavenham Rd. Southfields, S.W.18. [8024

DOUGLAS, 1914, 2-speed, complete with lamps and horn; £35; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [7905

DOUGLAS, 1911-12, 2¾h.p., nearly new Dunlop tyres, excellent condition; seen any time; £15.—Oakman, Stanbridge Rd., Leighton Buzzard. [X7750

1915 Douglas, 2¾h.p., 2-speed, in very good condition, with horn and speedometer; 38 gns.—Davy, Leuzes, The Asylum, Goodmayes. [7975

1915 Genuine Douglas, 2¾h.p., mag., 2 speeds; £42 10.—Wandsworth Motor Exchange, Ebner St., Wandsworth Town Station). [8011

DOUGLAS for sale, splendid condition throughout, Lamps, spares, etc., tyres new; £25, or near offer.—Pusey, 90, Camden St., N.W.1. [7974

RIDER TROWARD and Co., 31, High St., Hampstead.—Douglas, 4h.p., 3-speed T.T. Colonial model, 59 gns.; Douglas, 1914, 2-speed, 35 gns. [8031

DOUGLAS, 1914, 2 speeds, clutch, and kick starter, lamps, etc., perfect condition; £35.—Gayford, 304, Fulham Rd., London. Kensington 1453. [8016

DOUGLAS, 1915, 4h.p., Douglas coach sidecar, perfect condition; £57/10; part exchange entertained.—Lieut. Rawlings, 5, Victoria Av., Surbiton. [X7632

DOUGLAS, 2¾h.p., 2-speed, good going order; £18 for quick sale; can be seen week-ends.—58, Malvern Rd., Dalston, London, E.8. [7957

DOUGLAS Motor Cycles.—We can supply by return 1918 models on receipt of permit.—Eli Clark, the Douglas agent, 196, Cheltenham Rd., Bristol. [0923

NEW Douglas Motor Bicycles.—The latest 2¾h.p. models for instant delivery for those engaged on work of National importance against permits. How and where to obtain them, fullest particulars and prices, apply to Robinson's Garage, Green St., Cambridge. [7992

1918 4h.p. Douglas Combination, chain drive, one-lever carburetter, interchangeable wheels, the latest in every respect, with special coach sidecar, hood, screen, and spring wheel, 3 lamp sets, Cowey speedometer, horn, in perfect condition, driven a few miles only for demonstration purposes.—Prices and particulars, Robinson's Garage, Green St., Cambridge. [7993

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RIDER TROWARD and Co., 31, High St., Hampstead.—Enfield, 1916, 3h.p., 2-speed, clutch, kick start; 39 gns. [8032

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1917 Enfield Combination, 6h.p., lamps, horn, speedometer, very good condition; £90.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

ENFIELD 3h.p. Twin, 2 speeds, etc., about 1916; accept £34 to effect quick sale; higher powered machine wanted. 24, Grosvenor Av., East Sheen, S.W.14 [7995

ENFIELD, 1914, 6h.p., 2-seater sidecar, £60; 1914, 6h.p. combination, £70; ditto, £72; 1916 8h.p. combination, 2-seater sidecar, £85.—Maude's, 100, Gt. Portland St., London, W.1. [7882

F.N.

RIDER TROWARD and Co., 31, High St., Hampstead. F.N., 1913, 5-6h.p., 2-speed, clutch; 25 gns. [8027

4-CYL. F.N., bought 1914, ridden 500 miles, new condition; £25, bargain.—125, Willow Av., Edgbaston, Birmingham. [X7621

Harley-Davidson.

1917 Harley-Davidson and sporting torpedo sidecar, lamps, horn, good condition; £110.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0493

60 Gns. complete.—Late 1915 Harley-Davidson combination, like new, been stored; a real bargain; seen and ridden any time.—Miller, 62, Hampstead Rd., N.W.1. [8019

HARLEY-DAVIDSON, 1916, electric model, special sidecar, 85 gns.; also 1915 electric model, with Harley sidecar, £65; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [7902

HARLEY Combination, 1915, in perfect mechanical condition, and well cared for, electric lighting, self-charging, the property of an officer, little used.—Reply, Box L7,080, *c/o The Motor Cycle* [7947

HARLEY-DAVIDSON, late 1916, electrically equipped model, with sporting torpedo sidecar, hood and wind screen, little used, like new; 75 gns.—Hitch, 264, Hertford Rd., Waltham Cross. [7977

HARLEY-DAVIDSON Combination, 1917 model, dynamo lighting, Mills-Fulford Harley sporting sidecar, good tyres, many extras, whole outfit absolutely as new; £120.—Melies and Melies, 154-6, Gt. Portland St., W.1. Tel.: 3426 Mayfair. [7988

Henderson.

HENDERSON, 10h.p., 4-cyl., 1915 model, complete with sidecar, lamps, etc., a splendid combination; £87/10; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1 [7903

RIDER TROWARD and Co., 31, High St., Hampstead.—Henderson, nearly new 10h.p., 4-cyl., 2-speed, undershung Mills-Fulford 20 gn. sidecar, luggage and petrol can carriers, fully equipped, and in perfect order; 79 gns. [8035

Humber.

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RIDER TROWARD and Co., 31, High St., Hampstead.—Humber, new 1918, 3½h.p., flat twin, 3-speed; 75 gns. [8034

HUMBER, 1915½, 3½h.p., water-cooled, Sturmey 3-speed, clutch, and K.S., good condition throughout.—Knight, Sewardstone, Chingford. [8003

HUMBER, 3½-4h.p. flat twin, green military model, and torpedo sidecar, T.T. bars, lamps, horn, practically new; bargain, 75 gns.—15, Avondale Rd., Derby. [X7722

HUMBER Combination, 1915, 3½h.p., single, 3-speed, clutch, and kick start, fitted for paraffin, mileage 2,000; £45; take S.C. lathe or F.N. 4-cyl. as part exchange.—Cowling, 21, Beacheroft Av., Southall [7938

Indian.

1915 Indian Combination, 5h.p., 3-speed, T.T. bars; £50.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

INDIAN 1916 Powerplus Combination, spring frame, dynamo, wood screen, luggage carrier, in splendid condition, all spares; £90.—26, Hargrave Rd., Highgate, N. [7927

1915 7-9h.p. 3-speed Indian and special Indian sidecar (cost £22), speedometer, heavy Dunlop tyres, sound mechanical order; £52/10 cash.—P. Riddelsdell, Boxford, Suffolk. [7986

7-9h.p. Indian, 1916, very little used, in perfect condition, fast and powerful machine, sidecar fitted with hood and screen, etc.; complete £90.—Hillcoat, Grand Hotel, Dover. [7450

1916 5-6h.p. Indian Combination, 3-speed, kick start, hand clutch, perfect; £55, or would exchange for late 2¾h.p. 3-speed Sunbeam, or A.J.S.—Phillips, Anzac Villa, Chandlerstord, Hants [X7779

RIDER TROWARD and Co., 31, High St., Hampstead.—Indian, 1914, 7-9h.p., 2-speed, coachbuilt combination, 52 gns.; Indian, 1915, T.T., 7-9h.p., clutch, 38 gns.; ditto, 1914, 29 gns. [8036

INDIAN Combination, 5-6h.p., automatic carburetter, spring frame, condition as new, sidecar well sprung, with wind screen, lamps and horn, foot clutch, Brooks saddle; price 65 gns.; E.P. or exchange.—The Service Co., 292, High Holborn, London. [X7815

MOTOR CYCLES FOR SALE.

James.

4¼h.p. James Combination, all-chain drive; going cheap for cash, £30.—Chamberlin, Blue Bell Cottage, Welshpool. [X7766

JAMES 4¼h.p. Combination, bought new 1916; cost £100; hardly used; sacrifice £60.—12, Glenisla Gardens, Edinburgh. [X7737

JAMES Combination, late 1915, 4¼h.p., kick starter, encased chain drive, in good condition; £65.—Jury, 27, Commercial Quay, Dover. [7939

RIDER TROWARD and Co., 31, High St., Hampstead.—James, 1916, 3½h.p. twin, 3-speed, 48 gns.; James, 1914, 4¼h.p., single speed, renovated, 29 gns.; James, 1914, 4¼h.p., 3-speed, renovated, 37 gns. [8037

Levis.

1916 Levis, 2½h.p., 2-speed Enfield gear; £27.—Cross, Jeweller, Rotherham. [X7774

LEVIS, 1915 model. 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

LEVIS, 1917 model, new machine, slightly shop-soiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St, Ledbury. [X7263

LEVIS, 2¼h.p., 1915, Senspray, E.I.C., Cowey speedometer, Lucas lamps, horn, knee-grips, very fast; £18.—Quilter, Methersgate Hall, Woodbridge. [7953

LEVIS, latest type, 2 speeds, 2-stroke model; immediate delivery for work of National importance; £47/10.—Maudes', 100, Gt. Portland St., London, W.1. [6110

1918½ Levis, 2¼h.p. Popular, special machine, with spare cylinder and piston, £10 worth of accessories, fully equipped; open to expert examination; cost £43 in May; equipped, not run 80 miles, unscratched; what cash offers? 12 months guarantee.—Apply, W. N. Sadler, Danesbury House, Chatsworth Rd., Ellesmere Park, Eccles, Manchester. [7933

Lincoln-Elk

RIDER TROWARD and Co., 31, High St., Hampstead.—Lincoln-Elk, 1913, 3½h.p., waterproof Bosch, variable gear; 19 gns. [8038

L.M.C.

4½h.p. L.M.C., in good condition, kick starter, Bosch mag., guaranteed; £25, or near offer.—Vince, 91, Upper North St., Poplar. [7932

Matchless.

1914 Matchless Combination, 8h.p. M.A.G., 3-speed; £65.—Below.

IMMEDIATE Delivery from stock of the W.O. Model 8h.p. J.A.P.-Matchless combination, spare wheel; £125.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

RIDER TROWARD and Co., 31, High St., Hampstead.—Matchless 1913 6h.p. 2-speed coachbuilt combination; 35 gns. [8039

MATCHLESS War Model Combination, with spare wheel and tyre; I have two at £125 each; trade enquiry entertained; seen by appointment.—1a, Bloomfield Rd., Plumstead, S.E.18. [7664

MATCHLESS.—Early deliveries of 8h.p. J.A.P. war model combination, spare wheel; £125; exchanges arranged. Now booking post-war deliveries.—Maudes', 100, Gt. Portland St., London, W.1. [7737

MATCHLESS 1914 Combination, 8h.p. J.A.P. engine, £75; practically new combination, complete with hood, screen, spare wheel, Palmer tyres, speedometer, lamps, horn, etc., M.A.G. engine, £125; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X7816

Minerva.

MINERVA, 3½h.p., Dunlops, good order, £8.—Villa Christine, Ronald Hill Grove, Leigh, Essex. [7913

MINERVA, 3½h.p., Bosch mag., B. and B., engine perfect; £12.—Parradine, Leaden Roding, Essex. [7926

MINERVA 6h.p. Twin, Grade pulley, B. and B., Bosch mag.; £10; week-ends.—Sharp, 39, Langdon Rd., Highgate, N. [7969

Norton.

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N.U.T.

RIDER TROWARD and Co., 31, High St., Hampstead.—N.U.T.-J.A.P., 1915, 3½h.p. twin, 3-speed sporting sidecar, 47 gns.; N.U.T.-J.A.P., 1915, 3½h.p. twin, o.h.v., 35 gns. [804

P. and M.

RIDER TROWARD and Co., 31, High St., Hampstead.—P. and M., 1911, 3½h.p., 2-speed; 22 gns. [804

P. and M. 6h.p. Twin Combination, perfect condition, Bosch mag., speedometer, spare tyre, electric lighting, very luxurious sidecar, luggage grid, clock, petrol carrier, electric horn, lockers, all accessories, tools, and spares; £100.—Goodwin, 60, Mark Lane, London, E.C. [801

FOR Sale, P. and M. motor cycles, 3½h.p. 1914 and 1915 models (2-speed chain driven), together with delivery van mounted on sidecar chassis, in good running order; during petrol shortage, the ideal delivery van for light loads; petrol consumption about 60 miles to the gallon; invaluable for delivery work of all kinds.—For further particulars apply, Box 2,255, c/o *The Motor Cycle*. [X778

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RIDER TROWARD and Co., 31, High St., Hampstead.—Premier 1914 3½h.p. 3-speed coachbuilt combination, 35 gns.; Premier 1913 3½h.p. 3-speed combination, 32 gns.; Premier, 1915, 2½h.p., clutch, as new, 24 gns.; Premier, 1914, 3½h.p., 2-speed countershaft, 29 gns. [804

Quadrant.

QUADRANT, 4½h.p., 1913, 3-speed hub, complete with sidecar, hood, screen, and apron; £35; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [790

Rex.

RIDER TROWARD and Co., 31, High St., Hampstead.—Rex 1913 6h.p. 2-speed combination; 2 gns. [804

5-6h.p. Rex, with sidecar, free engine, handle starting, Bosch mag., sound; £15.—Ruddock, 3, Forest Lane, Stratford. [800

Rover.

FOR Sale, late 1914 T.T. 3½h.p. Rover, single gear, only done 200 miles, perfect condition; cost £6 accept £54, complete bargain.—Apply, Stewart, Hea Farm, Petersfield. [79

ROVER Motor Cycles.—3½h.p. and 5-6h.p. models in stock for immediate delivery, both solo and sid car outfit; trade supplied; no permits required.—P. Evans, 91, John Bright St., Birmingham. [09

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RUDGE Multi Combination, 1914, 3½h.p., excellent condition; bargain, £31/10.—S., 18, South Brut Mews, Bond St., W. [79

RIDER TROWARD and Co., 31, High St., Hampstead.—Rudge Multi, 1917, brand new, 3½h. 62 gns.; Rudge Multi, 1914, 3½h.p., renovated, 34 gn with sidecar 39 gns.; Rudge Multi, 1913, standard, gns.; Rudge, 1915, 5-6h.p., 3-speed, renovated, 39 gn Rudge, 1914, T.T. Philipson, renovated, 27 gns.; Rud 1913, T.T., 22 gns. [80

Scott.

LATE 1914 3¾h.p. Scott, 2-speed, fully equipped spares, £37, or offers; also Triumph, in good co dition, lamps, horn, tools, clutch model, £20, or offe must sell.—Box 2,254, c/o *The Motor Cycle*. [X77

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IDER TROWARD and Co., 31, High St., Hampstead.—Sun-Villiers, 1916, 2-speed, 2-stroke, 22 ; ditto, single speed, 17 gns. [8048

CN-VILLIERS, 2½h.p., 2-stroke, 2-speed, new Aug., 1917, perfect condition, not done 500 miles; £35, offers.—Furness, Dentist, Chesterfield. [X7736

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1h.p. 1915 Sunbeam, beautiful condition; £70, or 2 near offer.—Barlas, Levengrove, Dumbarton. [X7760

1h.p. Sunbeam, B. and B., Bosch, 3 speeds, kick 2 starter, complete; £43.—Cross, Effingham Sq., therham. [X7775

IDER TROWARD and Co., 31, High St., Hampstead.—Sunbeam, 1915, 6h.p., 3-speed, Gloria sidecar; £5 gns. [8047

EW 1918 3½h.p. Sunbeam, hand controlled clutch 3-speed, kick starter, the very latest makers' price; M. permit required.—Jackson, Motors, Guildford. [7776

UNBEAM, 3½h.p., 1914 model, and sidecar, practically new, with lamps, speedometer, tools, etc., 0 miles usage, stored at Harrods since commencement of war; £95.—Holt, 22, Larkfield Rd., Richmond. [7929

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TORPEDO Coach Combination, 4½h.p twin S.T.A.S., Senspray, 3-speed Sturmey, Dunlops, 3 lamps, mechanical horn, hood and screen, as new; £60.—Barnett, 39, Hoe St., Walthamstow. [7912

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913 T.T. Triumph, 3½h.p., beautiful condition; £20.—Elce and Co., 15-16, Bishopsgate Av., Cornhill, E.C.3. [0552

TRIUMPH 1914 4h.p. Combination, cigar-shaped sidecar, 3-speed, all accessories, very sporty; £50.—Particulars, Meek, Rushall, Walsall. [7972

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TRIUMPH, 1914, 3-speed S.A., Gloria C.B. sidecar, luggage carrier, speedometer, lamps, perfect, used 4 days last two years; £47/10.—Letters, Lieut., 9, Tollacombe Place, Preston, Torquay. [X7821

912 Free Engine Triumph, 1913 engine, new Dunlop tyre back, new belt, complete with Lucas lamp, horn, and tools, perfect; seen any time; £23.—Glenbridge, Newlands, Albert Rd., West Bridgford, Notts. [X7723

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RIDER TROWARD and Co., 31, High St., Hampstead.—Veloce, 1916, 2-speed, 4-stroke, 25 gns.; Veloce, 1915, 2-speed, 2-stroke, lady's, 26 gns. [8052

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RIDER TROWARD and Co., 31, High St., Hampstead.—Williamson, 1915, 8-10h.p., water-cooled 2-speed combination, hood, screen, etc.; 65 gns. [8054

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RIDER TROWARD and Co., 31, High St., Hampstead.—Whiting-Jap, 1916, 4-5h.p. twin, 4-speed Jardine spring frame; 56 gns. [8056

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RIDER TROWARD and Co., 31, High St, Hampstead.—Wolf, 1916, 2-stroke; 19 gns. [8053

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RIDER TROWARD and Co., 31, High St., Hampstead.—Wooler, 1915, 2-speed, 2-stroke, spring frame, renovated; 28 gns. [8055

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6h.p. Zenith, J.A.P. engine, 1913, with C.B. sidecar; £35, or exchange 3½h.p. Triumph.—J. Cleaver, Toddington, Beds. [X7739

ZENITH 1914 T.T. Coach Combination, 6h.p., new condition; £45.—51, Maplethorpe Rd., Thornton Heath, S.E. (Or exchange.) [7960

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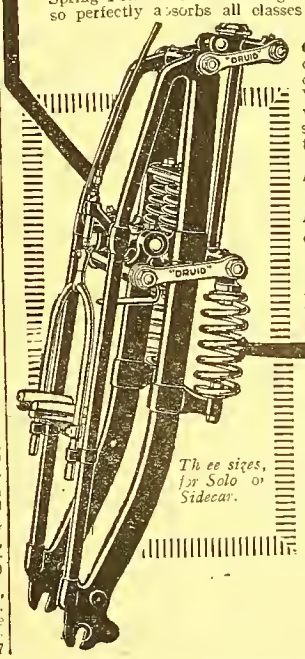

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1914 3-speed Countershaft Premier, newly plated and enamelled, appearance almost new, 3½h.p., just been thoroughly overhauled, very reliable machine; £40.—Gummerson, 5, John's Place, Acton. [7922

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LUGGAGE Trailers!—Several patterns from stock, others to order. Please call.—Trailer Manufacturing Co., 65, Rosendale Rd., West Norwood. [7880

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FOR Sale, 2-seater motor tricar, 8-10h.p. J.A.P. engine, wheel steering, hood, screen, very little used, in perfect running order.—Benyon, Rocklands, Bromyard. [7920

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MORGAN, 1917 De Luxe model, complete with hood, screen, C.A.V. dynamo, electric lighting outfit and 5 lamps, absolutely new condition throughout; £150.—Hopkins, New St., Ledbury. [X7261

MORGAN Runabouts.—Colmore Depot have all models in stock, sporting, De Luxe, and Grand Prix, overhauled and ready for the road; from £85.—49, John Bright St., Birmingham. [7943

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MORGAN, 1916, 8h.p. J.A.P., a.c., grey, almost new oversize tyres, P. and H. head lamps, extra large generator, oil tail lamp, metal screen, hood, new chains, smart, perfect mechanically; £95, quick sale; sight and thorough trial at Bradford.—A. Scott, 15, Derby St., Bradford. [7930

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6 h.p. Rover Sporting 2-seater, hood and screen, le magneto, accumulator ignition, side change, goo tyres; £18.

RENAULT Chassis, 7-9h.p., Bosch, T. and M. ca buretter, good condition; £20.

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9 h.p. 2-seater, Bosch mag., good tyres, nearly new Morgan body and screen, hood, 3-speed and r verse, lamps; owner abroad; £35; seen week-end.— Rossiter Rd., Balham, S.W.12. [792

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WOLSELEY Car (1905), modern 2-seater body, chai drive, new gears, wind screen, hood, chassis pe fect, engine requires overhauling; what offers?—Saun ders, 66, Churchfields Rd., Beckenham. [791

SWIFT 6h.p. 2-seater Car, 3 speeds, reverse, wate cooled, 3 new tyres, wind screen, perfect runnin order, painted Matchless grey; seen and tried by a pointment; £35, lowest.—Entwistle, Knockhall Hous Greenhithe. [X769

PAY Luxury Tax? Not in these. Buy a car no my boy, that's the tip. £50 saved on luxury ta will pay garage 4 years, while in 4 months—well "we h hopes." Anyway the war will be over long before th luxury tax is.—Cox, below.

TEMPTERS (remember many practically new; a dates below guaranteed accurate).—1914 12h. Buckingam cycle car, streamline 3-seater, all aluminium £50; 8-10h.p. Unique parcels lorry, late type, pointe radiator, watertight mag., £50; 15-20h.p. K.R.I.T. to pedo, monobloc, gate, Claudel, Bosch, detachables, £65 14-16h.p. Belsize 15-cwt. van, £65; 20h.p 6-cyl. Stand ard simi-sporting 4-seater, worth treble, £75; 15h. Charron chassis, 4-cyl. monobloc, £80; 14-16h.p. Da racq traveller's omnibus, monobloc, gate, Zenith, £85 8-10h.p. Alldays Midget 2-seater, Zenith, smartly r painted, £90.—Cox, below.

BUNGALOW Plots on Thames at Sunbury.—40 plot 100 each, freehold (or let £12 annum); migh consider good car value in exchange.—Cox, below.

13.9h.p. 1912 Darracq 4-seater monobloc, enclose valves, Zenith, £100; 2-ton Berliet commerci chassis, twin solids, extra long wheelbase, £100; 8-1 h.p. Renault chassis, taxi type, £115; 10h.p. 191 Lagonda coupe, 4-cyl. monobloc, detachable wheel extra smart, £120; 14-20h.p. Renault chassis, 4-spee long wheelbase, bargain, £125; 38h.p. Daimler T.M 4-stretcher ambulance, make fine commercial, £125 30h.p. National sporting 4-seater, £125; 11.9h. 1916-17 Argo sporting 4-seater, electric starter, dynam lighting, streamline, disc wheels, particularly smar £135; 16h.p. Bayard 1-ton van, twin solids, £135 12-15h.p. F.I.A.T. taxi type landaulet, monoblo £135; 10h.p. 4-cyl. 1914 Deemster streamline 2 seater, detachable wheels, smart, £145; 10h.p. 191 Horstmann streamline sporting 2-seater, 4-cyl. mon bloc, disc wheels detachable, self-starter, £145; 20h. B.S.A. chassis, £150; 10h.p. Calthorpe Minor stream line 2-seater, dickey, detachable wheels, monoblo bargain, £165; 11.9h.p. Belsize streamline 2-3-seate dynamo lighting, monobloc, detachables, £185; 30h. 6-cyl. Minerva platform lorry, £175; 1914-15 Stud baker van, £185 practically new £450 American far tractor, probably 1917-18, bargain, £185; 15-20h. 1913 Star ¾ landaulet, detachable steel wheels, e closed valves, long stroke engine, £235; 16-20h.p. Sm beam chassis, enclosed valves, detachable wheels, speed, £285; 15-22h.p. R.M.C. interior-drive saloo 4-seater, opens, dynamo lighting, detachables, mon bloc, streamline, low, exceptionally smart, fine cond tion, bargain, £350; 3-ton De Dion commerci chassis, latest round radiator type, worm drive, e closed valves, steel wheels, £385; 16h.p. Sunbea streamline torpedo, dynamo lighting, detachable wheel 4-cyl. monobloc engine, enclosed valves, smart, £385 25-30h.p. Vauxhall chassis, 6-cyl. monobloc, detachabl wire wheels, pointed radiator, £450; all above actual on view. Please call. Hours, 8 to 6.30. No busines on Sundays.—Douglas S. Cox, the absolutely straigh motor man, 6c, Lansdowne Hill, West Norwood, S.E Established 1902. [802

WE have the following cars for sale for cash, e tended payments, or your motor cycle in e change; Enfield, Alldays, R.M.C., Humberette, Hors mann.—Full particulars on application.—Service Co 292, High Holborn, London. [741

1914 Crescent, lovely torpedo 2-seater, 8-10h.p. twi water-cooled, enclosed Bosch, 4 speeds, revers nearly new tyres, hood, screen, speedometer, lamps, ove hauled, newly repainted, very smart car; any trial; onl 85 gns.; exchange any combination.—Wandsworth Moto Exchange, Ebner St., Wandsworth Town Station). [801

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The Motor Cycle and the Fuel Crisis.

IF the reports from authoritative sources form a true statement of the position with regard to existing stocks of coal fuel, the country is likely to be faced with a serious shortage of this vital and essential commodity. The reason for this state of things is not within our province to discuss. The air is full of dire threats of extraordinary reductions in railway facilities, of total absence of street lighting in cities, and a considerable reduction in tram services.

Whether or not the agitation now on foot for fuel conservation is exaggerated in order to scare the nation out of careless waste into paths of economy does not alter the fact that it is up to everyone to keep a rigid hand on all supplies and help in every possible way to prevent a crisis during the coming winter.

Obviously the railway companies are among the chief users of coal fuel, and it follows that if a considerable reduction of passenger traffic could be effected, it would be a very definite step in the right direction. But there are thousands of regular passengers who must of necessity travel daily to and from business. The number of season ticket holders in the London district, in the Midland munition areas, and in the regions of shipbuilding yards throughout the country probably runs into hundreds of thousands. Of these a great many are, or rather were, motor cyclists. A large majority have their machines laid up by reason of the petrol restrictions. How many of these riders would jump at the chance to travel by road rather than by rail? There is nothing enjoyable in daily railroad travelling, and all, or nearly all, of these former motor cyclists would hail with delight the prospect of a return of their well-tried mode of going to business.

Assuming that in any large business district one thousand gallons of petrol per week be released, this means over seventy thousand miles road travel, or sufficient for seven hundred riders at one hundred miles per week each. To the railway company this means approximately two train loads (morning and evening) less per day. The consequent saving in coal, engine and rolling stock repairs, and labour and time of employees would be found so considerable as to justify completely the use of petrol.

The suggestion is that motor cyclists who are of necessity passengers by rail should be granted permits to use petrol for particularly specified business journeys only. It is then up to the police authorities to weed out those who endeavour to take undue advantage of this concession. Release sufficient petrol and thousands of motor cyclists will gladly say good-bye to daily railway travelling. The motor cycle is the most economical form of travel in existence, excepting the push-cycle and "shanks pony," and it could be turned to great national use if only the Petrol Committee in conjunction with the railway companies would see matters in that light.

The question resolves itself into this. Which is the more important from the point of view of the national good—the conservation of coal, or that of petrol? If the conservation of petrol is more important than that of coal, then motor cyclists must make a sacrifice for the national good with the same good grace that they have shown (with certain exceptions) all along the line. On the other hand, if coal is, at the present time, more of a national asset than petrol, then surely it is queer policy to conserve the latter at the expense of the former. The subject is, of course, one that can only be dealt with at all competently by the authorities concerned, and at the present time we are rather of the opinion that a heart to heart talk between the Coal Controller and the Petrol Controller might have rather useful results. If the talk materialised and the results were shown to be negligible, then neither we nor anyone else could have any more to say on the matter.

An index to the advertisements in this issue will be found on the page facing the back cover.

The Mixed Turbine as a Motor Cycle Power Unit.

A Suggested Prime Mover using Paraffin and Water as Fuel.

AT the present time, when the development of the motor cycle is more or less at a standstill owing to war conditions, it is interesting to conjecture on what lines this delayed progress will come. There is considerable talk at the present time amongst motorists of the adaptation of the aeroplane type of engine to motor cycles.

From the point of view of even torque on the road wheel and flexibility in operation, it is obvious that the multi-cylinder machine has a big pull. To the critical rider who has grown tired of the vibration of the single the aeroplane type of engine would seem to be the last word in comfort; but, as things stand at present, there are almost insuperable difficulties to surmount before a reliable or even practicable machine can be produced.

Practical Aspects.

To manufacture a series of revolving cylinders in which reciprocate pistons, composing the engine, requires great accuracy of workmanship, and even then it is liable to derangement from road shock, etc.

Although a reliable engine has been evolved on these lines it is by sacrificing cost and labour for result. Thus nearly all aeroplane engine parts are machined from the solid.

To produce a motor cycle engine on these lines would put the price beyond the reach of the average rider, and, moreover, the engine would require more attention than one of the present day.

Nevertheless, the desire for a smooth drive could be met, the writer would suggest, by an extension of the principle of multi-cylinders, namely, the mixed impulse turbine.

Although perhaps it is rather early to talk confidently on the possibilities of the mixed turbine, the writer is informed that already one firm of Continental engineers has made experiments with such turbines, although, for obvious reasons, the firm has not published the results

And now to describe the construction and operation of such a turbine as applicable to a motor cycle.

Constructional Details.

In the first place, the pressure-producing generator must be described.

This, as shown in the sketch, would consist of a series of nozzles arranged concentrically.

Fuel oil (such as paraffin) is first forced by a pump through the central nozzle A, and passing through the narrow neck A_1 is broken up, and on mixing with air, flowing through nozzle B, under pressure, emerges from the latter as a flame. This plays directly on to the surrounding jet of water in nozzle C and by direct contact steam is generated under pressure.

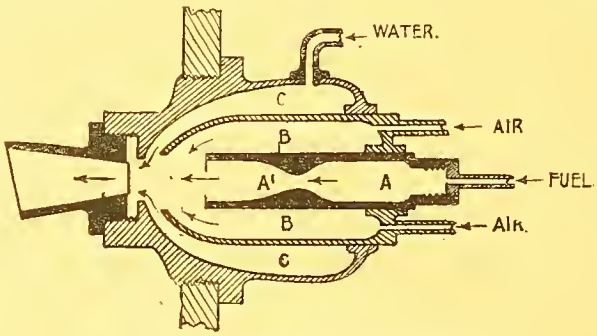
The gases of combustion, however, pass on along with the steam, and hence the final gas under pressure is a mixture of steam and carbon dioxide—hence the name "mixed turbine."

The jet of the gas issuing from the nozzle C now passes down a nozzle of suitable divergence, in which the pressure energy is converted into kinetic or velocity energy.

It now impinges on the vanes of a single velocity wheel turbine, such as a de Laval, and after doing its work there passes on to exhaust into an atmospheric condenser, which is simply a nest of tubes of small diameter round which air circulates. Here the gases of combustion are separated out, and the water condensed passes on to the pump supplying water to nozzle C.

Continuous Torque.

From this summary it is seen that the cycle would be continuous, and there would be absolutely no variation in the turning effort. The problem of controlling the speed is simply that of changing the nozzle areas to give the correct flow of steam.



Diagrammatic arrangement of pressure generator.

This means sliding nozzles A and B into nozzle C, and since the proportion of air to fuel required for combustion remains constant these nozzles could both be shifted by the same lever. The only other refinement necessary is a pilot burner for igniting the main nozzles, after the engine had been shut down, and a hand pump for supplying pressure to the nozzles for starting up.

There would be no necessity to turn the engine round at all when starting, as, of course, a turbine wheel will start equally well in any position, and as soon as the nozzles were in operation the turbine could be started on load if necessary.

The main difficulty lies in the pumps for supplying the nozzles, but the only one of any size is that supplying the air nozzle B. If this were constructed on the rotary type running at the speed of the turbine shaft it would still be quite small.

Engine Sizes and Speeds.

As regards sizes: for a 5 h.p. machine, in order to secure sufficient blade areas and to obtain a suitable ratio for blade and gas velocities, the wheel would require to be approximately 9in. diameter and to run at 5,000 r.p.m.

Although this may possibly sound dangerously high to the man accustomed only to reciprocating engines, it is quite practicable.

Indeed there are many small de Laval steam turbines with speeds of 10,000 to 15,000 r.p.m. which have been running satisfactorily for years.

A 9in. diameter wheel could quite easily be accommodated on a motor cycle even with the plane of rotation across the frame. This arrangement would prevent any gyroscopic action harmful to balance, and, in addition, would make the machine more stable on bad roads.

Transmission.

Of course, a gear box would be necessary to reduce the speed from 5,000 r.p.m. to road speed, but this, with worm gearing, is quite a simple proposition, and as there is no need to have more than one speed reduction the gear box need be no bigger than a present-day countershaft gear box of, say, the B.S.A. type.

The power could be transmitted straight from the slow speed shaft of the gear box to the rear wheel by means of a shaft similar to the F.N. drive, and with a helical spring embodied in the drive.

The reason for utilising a turbine of the impulse type is that it is eminently suitable for rough usage, as the following points show:

1. There is no end thrust.
2. There are no fine clearances in the cylinder, and, therefore, there is no possibility of stripping blading or other damage.
3. A smaller wheel can be used for a given power than with any other type of turbine.

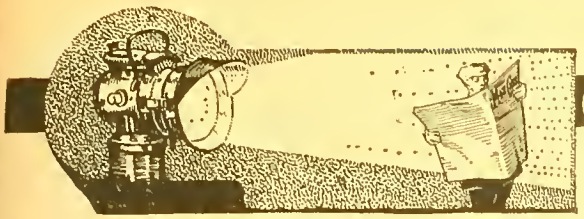
Of course, the main thing to aim at is reliability, and naturally the first question one asks is, "Can a turbine such as this withstand road shocks?" As a matter of fact, there are turbines of this type mounted on railway trucks, which, in addition to withstanding running shocks, have to withstand those of shunting, etc., and so there need be no fear that the impulse turbine is not sufficiently robust for this work.

Cost Considerations.

The cost of a machine fitted with this type of power unit would not be very different from that of the present day mount, although if the machine were standardised it should be possible to turn it out slightly cheaper than a complete petrol power unit.

The success of the principle can only be tested by experiment; but, if the present tendency towards the adaptation of aero practices continues to hold, it is a natural extension to be expected when once again the motor trade blossoms forth with new ideas. G.H.P.

How far does cost influence a market? According to some traders it has not the slightest influence, at the present time, which is interesting in connection with the luxury tax



Occasional Comments

By Ixion

Richthofen's Death.

MY colleague "Torque" has much enjoyed the controversy which arose over his original assertion that von Richthofen was shot down by a British airman. When he penned the statement, only the Censor prevented his naming the victor. The subsequent dispute has thrown interesting side-lights on the psychology of evidence.

I Recant.

A TECHNICAL friend has just whispered the very latest about the flat twin. The Hun has taken it up. I am not in a position to say whether he has copied the Douglas or the A.B.C., but it is at any rate asserted that during the last month Hun air-cooled flat twins have fallen into our hands. I must reconsider my whole position in the matter.

Streamlining.

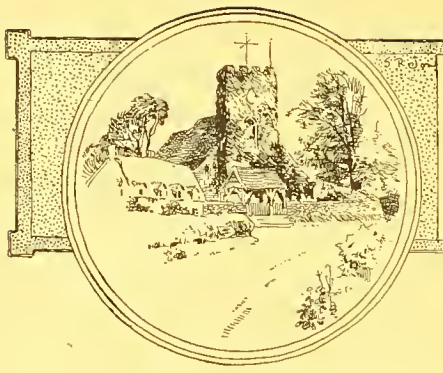
MR. BURDETT hardly goes far enough in commencing his streamlining at the front mudguard. The correct streamlining contour for normal motor cycling speeds resembles the plan of a guillemot's egg. The front wheel would create a grievous protuberance on this ovaloid form, and must itself be encased in the blunt nose of the egg-shaped wind divider. When Mr. Burdett has fitted his jigger up, I will come and watch him taking a sharp corner in a cross gale. I will also bring one of our staff photographers with me. Streamlining of the rider and machine is, of course, worse than useless except in racing, and only then on a calm day or in a brief straight sprint. The speed of the motor cycle is so low that it cannot afford to expose a great area of surface to side winds. The pottering type of rider will get little benefit from streamlining his cylinder fins *à la* Road Rider; but if he streamlines himself he will merely get blown over.

Speedman's Wobble.

WILL some highbrow amid the freemasonry of our readers expound the theory of "speedman's wobble" for the benefit of such practical ignorami (or should it be "muses"?) as myself? For the benefit of novices I proceed to expound what speedman's wobble *is*, appealing to the educated section of the public to expound how it comes. Briefly, having concluded your novitiate, you dispose at a heavy loss of the 1907 dud which some genial veteran unloaded on you as a special favour, and buy a brand-new mount of unquestionable ginger. You seek a straight and lonely road, and proceed to "whack her up." She responds. You try to be a man. You choke down the rising terror which besets you. You assure yourself that the articulations of your vertebræ are not really coming unstuck. By an immense effort of will you curb that itching forefinger from pulling the throttle back. The speedometer needle stealthily caresses the "60." Your pulse beats are almost imperceptibly dropping a few revs and ceasing to drum in your ears like a Gotha on the roof, when the front wheel commences a superb imitation of a hare dodging a push bicycle at night by acetylene light. Instead of rolling straight forward, it commences what W. G. Aston would describe as a "cycloidal" path, I believe. In other words, it inscribes on the road a track which looks like an enormous valve spring pulled out by locomotives attached to each end. The axes or foci or mantes, or whatever they call them, begin to expand: in other words, the swaying and lurching and looping and rolling get steadily worse. A corner approaches, and you realise that whether you can take it or not depends on whether the bicycle is side-looping to the left or right at the crucial moment. In either case, it is obvious that any further lateral increase in the thingumbob means stubbing your face against the high stone walls to either side. These problems are never settled, because the machine suddenly lies down on its side and slides, while you excoriate the road with your nose and ear forty yards further on.

Getting Out of It.

THERE are a few people who have survived speedman's wobble, and the proof is that every man who has done "sixty" on the road has been in it. (N.B.—Many men who talk glibly of "sixty" have never clocked more than forty-five.) Yea, and some of these survivors have noses, and also chins and ears. I myself have been in many of these wobbles, and each time the dread is greater. The golden rule is never to let the machine start: it starts at various speeds with various types of fork and frame, though no machine is immune from it. Firm steering prevents its genesis. The fool who likes to risk his neck at railway and aeroplane speeds must practically lock his steering by jamming his wrists inwards and getting a purchase with his feet against the side plates of the boot-bar, and kinking his back rigid like the stays behind the buffers at a railway terminus. If he thus converts his anatomy into a series of triangulated girders for bracing the steering, speedman's wobble will seldom come his way. Sooner or later he will grow careless, and try to scratch the back of his neck whilst leaning out round a corner at fifty: then the wobble will be on him in an instant. To apply the brakes is foolish. To slam the throttle shut is *felo de se*. To lift the valve is worse. A gradual reduction of speed will flatten out the sinuous path which the track must assume where a sudden and marked speed reduction would invite the machine to lie down. Gradually control will be regained, but, ugh! it is a nasty experience. Yes, gentlemen, your suspicions are quite correct. My latest 10 h.p. gave me a peach the other day, and I traded it off just before bed-time for a Baby Levis and four sugar coupons.

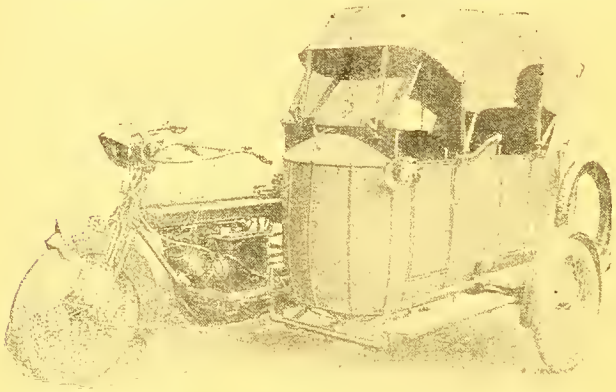


ACCOMMODATION FOR THREE.

Some Notes on Sidecars in General and Double-seaters in Particular.

IT is probably true that most sidecar combinations are used to carry more than one passenger. One may say that the extra passenger on the motor cycle is seen more often than the occupant of a dickey seat on a light car.

Usually the extra passenger is carried on a cushion fixed to the carrier, while quite a large number of sidecar manufacturers have introduced tandem seated



The Craven two-seater—an elaborate sidecar of unusual design.

attachments. These, however, generally are intended to provide accommodation for a juvenile in addition to one adult, but a few makers have made serious attempts to make a two-seater body for two adults. At least one manufacturer produced a sidecar providing the same accommodation as a car and was not content with merely designing a body large enough to seat four persons, but it was made a landaulet with standing front.

The Limit—so Far.

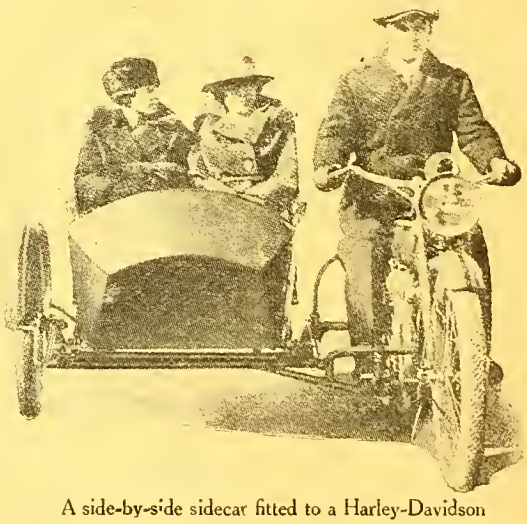
This sidecar was the Williamson produced in 1913, and at the time the majority of motor cyclists were inclined to think that this was carrying the sidecar idea too far. But was it? This machine was not a freak, neither was it a single model produced for publicity purposes. Several were sent abroad where they were used as taxicabs. Such a large machine probably has its limits. For example, one cannot imagine the sporting owner favouring such a design, but for a professional man and other services where a paid driver is required the only doubtful points are connected with its mechanics. It must be remembered always that the sidecar originally was just a light cane chair intended for the occasional accommodation of a passenger. I doubt whether the early sidecar manufacturers expected the enormous popularity which came to the side attachment. With this in mind one is constrained to wonder whether chassis design has kept pace with the development of the sidecar body. From an invalid chair the sidecar has developed into a luxurious coupé, yet the chassis and connections are fundamentally the same.

The chassis is still rigidly connected with the motor cycle frame which is unsprung. The load is unevenly distributed, and very few alterations have been made since a famous six days trial when scarcely one machine finished up without some breakage in connection with the sidecar. Certain it is there is some justification for the claim of engineers that the sidecar is unmechanical.

The Most Popular Passenger Vehicle.

Nevertheless, it works, and it works well, and it has been the means of introducing thousands to motoring who would not have known its pleasures.

It should be remembered also that, despite the hundreds of attempts to make the sidecar substitute, the sidecar still remains the most popular form of motor vehicle on the road. Therefore, provided chassis are designed with due thought of the work they are called upon to perform, there is no reason why the double-seated sidecar should not become very popular. In lieu of a "more mechanical" type of vehicle, accommodation for three will be in strong demand after the war, if only because, since private motoring ceased, children who could be carried by the lady passenger will have grown and added corre-



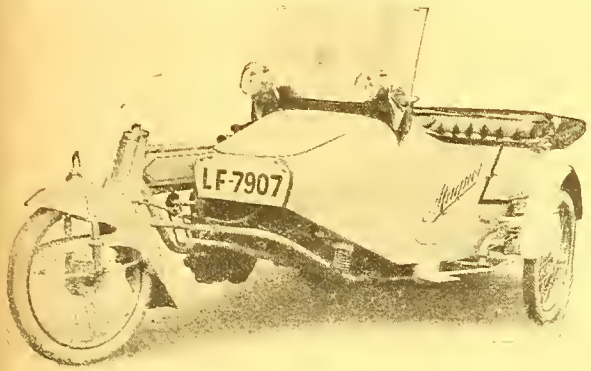
A side-by-side sidecar fitted to a Harley-Davidson

Accommodation for Three.—

sponding weight. They will require a separate seat, and the owner will prefer to accommodate his family inside the body rather than fix up a pillion on the carrier. Again, a large number of ex-motorists may not be able to afford a light car. Prices will be up, and, as everybody has not been employed on munitions, incomes will be down. There is bound to be a demand for a cheap, economical motor vehicle capable of accommodating three adults from this cause alone.

Tandem or Side-by-side ?

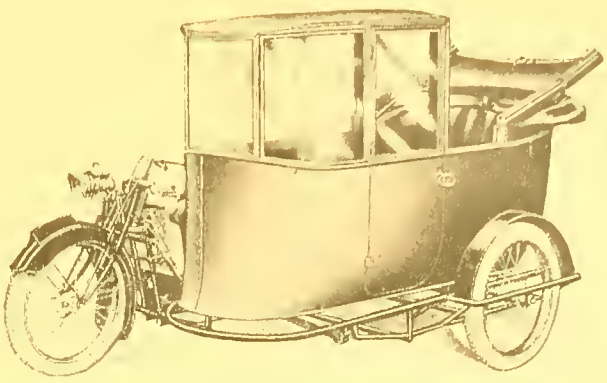
If manufacturers start with this idea, instead of finishing with it as hitherto, there is no knowing to what extent the sidecar proposition may be carried, and one wonders what form the multi-seater will take. Will it have tandem or side-by-side seats, or will it provide accommodation for three within the body



A three-seated sidecar from which the driver controls the machine —the Magnet. The driver's seat is immediately behind the screen.

as was the case with the Magnet illustrated here? This was a continental-produced machine, with a 10 h.p. air-cooled engine and chain transmission. The driver had a single seat at the front, and accommodation for two passengers was provided at the rear. A hood and screen completed the comfort of the machine, which was designed throughout as a three-seater, and was not, as in the majority of cases, merely a large sidecar fitted to a motor cycle frame which had been designed for much lighter loads.

The Craven, also illustrated, is an example of a tandem-seated sidecar with hood and screen, but in this case the design appeared too high to appeal very strongly to the average motor cyclist.

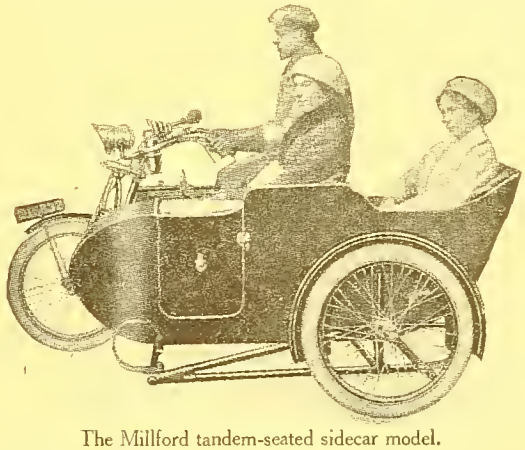


The Williamson landaulet, specially built and luxuriously fitted.

It is probable, however, that the double-seated sidecar of the immediate future will not be so ambitious, and designs on the lines of the Millford Tandem or the American side-by-side seater shown on the previous page may have a stronger appeal.

In the meantime it behoves us not to ridicule any idea that is beyond our present perspective. It is only about fifteen years ago when we considered 3½ h.p. machines bordering on the edge of absurdity on account of their high power.

It has been demonstrated that a sidecar can accomplish anything of which a car is capable—and does it more economically. If three wheels can give the same service as four, why have four? VEDETTE.

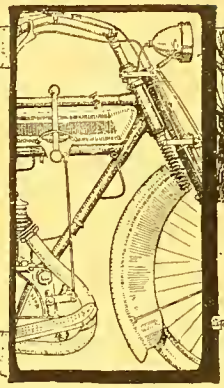


The Millford tandem-seated sidecar model.

MOTOR CYCLES AND AEROPLANE CONSTRUCTION.

IT appears to be agreed generally that when designers seriously set to work on their post-war products the many lessons obtained in the production of aeroplane engines and parts will be reflected in their motor cycles. It will be interesting to watch in what direction these influences will effect motor cycle design. Will future machines be lighter? And, if so, how will the weight reduction be obtained? The war has taught many firms how to use the lighter metals successfully. New alloys and new ways to use light sheet steel have been discovered. Probably there is nothing so directly opposite in mechanical principles as the aeroplane fuselage and the frame of a car or motor cycle. In the former scientific design of the whole produces its strength. Separately each part practically has no strength compared with the pressed steel or tubular members of a car or motor cycle frame. In other words, in the latter cases sheer bulk of metal is responsible for their strength, and the principles of triangulation, compression, and tension are not taken into serious consideration. Designers who have been connected with fuselage construction during the war may turn their attention to the production of a motor cycle frame embodying similar principles. Again, aluminium may be used more extensively, and different alloys composed largely of this metal may be used for connecting rods, pistons, cylinders, and even valves. Before the war an experimental engine having aluminium valves was in existence in this country. SPES.

THE BEST POSITION FOR THE CLUTCH.



THE ADVANTAGES OF THE COUNTERSHAFT POSITION.

RECENTLY a correspondent queried the accuracy of a statement I made to the effect that the countershaft is the best position for a motor cycle clutch. He points out that the higher the speed of the clutch the lower the torque it is called upon to deliver—*i.e.*, if the clutch be running at engine shaft speed, it can be made smaller and lighter than one running at half engine speed, because it will not have to deliver so high a load. All this is, of course, fairly obvious and most cheerfully admitted, but experience has shown that in present-day motor cycle design the countershaft is a more satisfactory and convenient position for the clutch than the engine shaft, excepting, of course, in four-cylinder design. Even in the case of the latter I am of the opinion that, if it were convenient to employ a clutch running at half engine speed, it would be in many ways advantageous to do so, though this point is decided only by the width of the clutch it is possible to use.

Advantages of the Geared-down Clutch.

Putting aside for a moment all questions relating to weight, let us see what advantages are offered by employing a clutch in a geared down position. First, there is the important question of wear. In this respect the actual pressure on the friction surfaces is not so much a deciding factor as is the speed at which the friction surfaces are brought into contact. In sharpening a razor very poor results would be obtained by dragging the blade slowly across the strop, even though considerable pressure were brought to bear upon it; it is the quick, light stroke that wears the metal and gives the desired cutting edge. It can be argued, therefore, that if two metal surfaces be brought into contact when travelling in opposite direction at high speed, they will wear more rapidly than if brought into contact when travelling at half the speed, even if double the pressure be exerted in the latter case.

It will not be denied that a clutch running at engine speed becomes very much hotter than one running at countershaft speed. This, then, proves that friction, heat loss and wear are very much greater in the case of the former. Heat not only means rapid deterioration, but leads to trouble in the direction of lubrication. Metal-to-metal clutches running at engine speed demand ample lubrication, which means an oil trough and other accessories which probably add to the weight. Moreover, owing to the excessive heat, they are never quite free, and demand endless adjustment, and an engine shaft clutch needs to be freer than one on the countershaft. If the design be such that plates of very considerable diameter can be employed, so that the very lightest pressure gives the desired grip, these defects are removed and the engine shaft clutch scores almost every way, but ordinary motor cycle design, barring again the four-cylinder, does not permit this.

The Compromise Position.

These, then, are one or two points in favour of the low speed clutch, but if I recall rightly my original statement was not so much to the effect that the engine speed clutch was to be discouraged, as it was that the countershaft position had proved a convenient intermediary between the engine shaft and the rear wheel. Neither of these has proved satisfactory, and in all kinds of machinery designers have gone out of their way to employ low speed clutches in preference to the theoretically superior high speed.

Again, it must be remembered that single-cylinder and twin-cylinder motor cycles do not deliver their torque so evenly as a four or six-cylinder, and therefore the clutch on the engine shaft is called upon always to function as a shock absorber, *i.e.*, every impulse of the engine passes through it. This alone causes excessive heat and wear. Let us say that each impulse causes ¼in. of slip; now, if the clutch were geared down to half engine speed, ⅛in. of slip would be equivalent to the ¼in. on the engine shaft, *i.e.*, less than half the wear would occur.

Under certain conditions, then, the engine speed clutch is superior to the countershaft. These conditions are that it be used in conjunction with an engine of even torque, and that it be of such width that the very lightest pressure is necessary to obtain the drive. My experiences of engine shaft clutches outside four-cylinder cars are not exactly fragrant, and doubtless many who drove old single-cylinder cars a few years ago could recount experiences similar to my own.

CHINOOK.

It is a known fact that for the same horse-power the weight of an engine decreases as the number of cylinders increase. Although a six-cylinder engine of given power gives almost six times the power of a single of the same cylinder dimensions the weight of the engine is only a little over two and a half times the weight of the single. From this it may be assumed the multi-cylinder motor cycle engine of the future will be of a lighter type than the average engine of to-day.

Times to Light Lamps.

SUMMER TIME.

Sept. 19th	...	7.36 p.m.
,, 21st	...	7.31 ,,
,, 23rd	...	7.27 ,,
,, 25th	...	7.22 ,,

The Sidecar in the Cinema.

Miss Mary Pickford is the latest "movie" star to use a sidecar combination for the screen.

Petrol for France.

It is stated that during a recent French offensive the consumption of petrol for the Army and Air Service was at the rate of 1,800 tons per day, representing a daily consumption of approximately 500,000 gallons.

The Industrial Reconstruction Council.

A conference on "Trade Boards" will be held under the auspices of the Industrial Reconstruction Council on Tuesday, September 24th, at 6 p.m., in the Hall of the Institute of Journalists, 2 and 4, Tudor Street, E.C.4. The subject will be introduced by Mr. J. J. Mallon, of the Anti-Sweating League, after which the discussion will be open. No tickets are necessary.

The Motor Cycle in New Fields.

The new expedition across Persia to Baku breaks into country hitherto untouched by the motor cycle. The advent of Douglases and Triumphs and the ubiquitous Ford, to say nothing of heavy lorries of various types, must have startled the natives of this country of carpets and cats. From letters received, we gather that roads are not so bad as might be expected, but stunt hill-climbs exist in profusion. The D.R.'s are unanimous in their preference for this mountainous district to the dusty plains of "Messpot."

The Rule of the Road—and Path.

It has been suggested several times of late that it would be desirable to alter the rule of the road, and follow the Continental fashion of keeping to the right. That this would cause a certain amount of confusion at first cannot be doubted. The elderly carter's mind is not so plastic as that of the motor driver, who in France has found no difficulty in doing as the French do. This seems to be the opinion of the London "Safety First" Council, who have hesitated to interfere with the rule of the road, but have recommended a change in the footpath custom of pedestrians.

Growth of Cheshire.

Cheshire has attained the dignity of a double registration number for motors —MA to supplement M. Certainly the letters sound well.

Have the police in the Tarvin district any special opinions on the matter?

Back to Motor Journalism.

Mr. J. Inglis Ker, one time editor of our Scottish contemporaries *The Motor World* and *Scottish Cyclist*, and of late manager for Scotland of the Motor Union Insurance Co., has acquired an interest in the wayfarer's monthly *The King's Highway*, which, we understand, will be conducted by him. Mr. Inglis Ker is an authority on Scottish roads.

An American's Idea of England and English Motor Cycles.

An American Army motor cyclist gives his views on British motor cycles: "Joe and I," he writes, "do anywhere from ten to eighteen hours a day riding, so you see we would be equal for almost anything. Joe is riding a sidecar now and I a solo. Believe me, these little old one-lungers are the goods. I can't begin to tell you the work they will do. They take a sidecar and passenger almost anywhere on high gear. Talking about gear, that is only a figure of speech for them. They have two engine drive chains running to a countershaft. By a system of wedges, a band is tightened or loosened, and in that way the rear chain gets its power. Some contraption, believe me. If some of our boys had them home they would go nuts. I saw a Sunbeam the other day—a 7 h.p. twin—with all drive chains running in oil. Some front fork, too. It sure is a pleasure to look at. It costs £106 over here—about $450.

"We have a 5 h.p. twin, three-speed Indian, with racing bars — in fact, all the machines here have short wide bars. Also we have a Rover, 4 h.p. single, three-speed. It is the nearest thing to our machines that I have seen. Have inspected the Triumph and Douglas, and they would give us a hold on our laurels any time.

"Last week I had a fine trip to Edinburgh, and sure did see some sights. Wally, the place is sure beautiful. I was in Holyrood Palace and Stirling Castle, and saw some great old curiosities. This is the country to tour. Every few miles you run across an old ruined castle or abbey. I will have some pictures when I get home, believe me. The roads are fine, but have some wicked turns. Also travelling on the left-hand side gets my goat."

Special Features.

ACCOMMODATION FOR THREE.

THE MIXED TURBINE AS A MOTOR CYCLE POWER UNIT.

FRONT WHEEL TRAIL.

Necessary Vehicles.

The U.S. Government are up to date. The War Industries Board and Priorities Commission, in an official statement, announce that motor cycles are recognised by the Government as practical and necessary vehicles of transportation.

United Action.

Early last month an important trade conference was held by American motor cycle makers, and a deputation went to Washington, where they were able to convince the U.S. Government that motor cycles are no longer toys and pleasure vehicles.

How Many Holiday Permits?

A motor cycling (civilian) engineering trade unionist, in employment at the Royal Arsenal, Woolwich, who received a petrol permit for the last August holidays, has, it is stated, now obtained another permit for his annual vacation that he intends spending in South Devon.

C.A.V. Athletic Sports.

On Saturday, September 21st, at 2.30 p.m., the Amateur Athletic Association of C. A. Vandervell and Co., Ltd., will hold a sports meeting on their club ground, Old Oak Road (opposite Askew Arms, Acton Vale). The entire proceeds will be devoted to the War Seal Foundation Fund. Such an excellent object will surely attract a large number of spectators to witness the many and varied items on the programme. The Crystal Palace Silver Band will give selections during the afternoon, and there will be several side shows, including "Houp-la," etc.

Dodging the Specials.

We hear of an elderly sidecar enthusiast, who, having no business reason for using petrol, but having a small stock in hand, makes surreptitious journeys "round the houses." He appears to have studied the beats of the local specials, and found certain safe times on certain days when he and his wife, dressed up as though for a week's tour, solemnly toddle round the neighbouring roads for a quarter of an hour or so. Presumably he intends to keep motor cycling on this lilliputian scale as long as his petrol lasts. May he never miscalculate his time o' day.

Lubrication and Friction.

The fundamental principle of metal lubrication is that a lubricating agent, spreading itself between the two metallic surfaces, prevents their actual contact and the meshing of the projections and indentations, thus eliminating the condition known as friction

Oilless Bearings.

We may yet have wheel and gear box bearings which require no oil or attention from one year's end to another. For several years experiments have been carried out with bearings charged with a form of graphite which it is said have stood up well under very heavy loads.

The Commercial Sidecar.

Considering the enormous scope for the sidecar for light delivery work, makers have done very little to cater for this demand. It is not sufficient to attach a box sidecar to a machine designed for pleasure purposes: there is room for a special machine, foolproof and weatherproof—in fact, built for utility purposes throughout.

Traffic Rules for Motorists.

The Automobile Club of Canada has recently submitted a proposal to the police authorities of Montreal to the effect that they should organise a "Traffic Day," on which drivers of all vehicles should be supplied from the police stations with printed copies of the traffic rules, regulations, and charts, in plain language, so that the users of the streets may know what is expected of them.

Larger Wheels.

A designer who has experimented extensively with spring frames advises us that, unless he can "hit upon" something very much better than he has tried already, he will recommend his company to fit larger tyres and larger diameter wheels, as he considers the shocks from war time roads would be reduced considerably if larger wheels and tyres were used.

Motor Cycle Waste in the U.S. Army.

As previously stated in these pages, the U.S.A. A.S.C., M.T., has not learnt to run the war with the same economy as its British *confrères*. We had to learn our lesson, and to learn it pretty thoroughly, and early in the war the amount of waste in this particular section of the Army was appalling. Now all this has changed, as has been indicated in the numerous articles which have appeared on the subject in *The Motor Cycle*.

As regards our American brethren, here is an instance: "They do not believe in regrinding cylinders, as they say it is too much trouble to carry different size pistons and rings. Everything has to be standard, so if anything is worn so that it would take something oversize it is junked, which is an awful waste. We use on an average about forty to fifty motor cycle castings in a month out here." This is from an American mechanic motor cyclist serving overseas. He states that rear tyres hardly ever last over 1,200 miles, and engines are overhauled once every 1,000 or 1,500 miles.

Carbide.

Carbide is released only for Government work, doctors' use, Red Cross work, public conveyances, public buildings, including schools, drill halls, churches, post offices, lorries engaged in carrying munitions or working for munition firms.

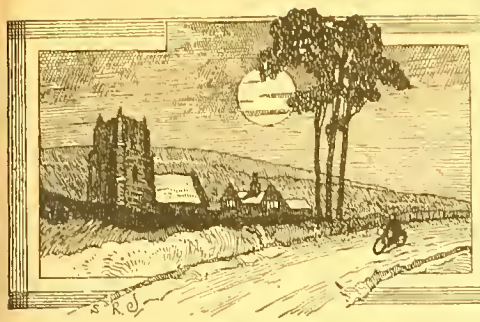
A Yankee-ridden Douglas.

Jay Heckman, formerly a mechanic in the employ of an American firm, and one of the best known motor cycle experts in Rochester, U.S.A., is now a despatch rider in a Headquarters Company somewhere in France. He was drafted about three months ago, and after a short stay in a New Jersey camp was sent over as a private, but since arriving in France he has been promoted sergeant and despatch rider. He is riding a Douglas light twin, and says "This is the life."

A Heavy Oil Atomiser.

A Swiss engineer is reported to have just patented an apparatus that is said successfully to atomise heavy oils, and to enable them to be used as fuel in internal combustion engines. The device consists of a vessel fed with oil through a pipe, the flow being controlled by a float valve. Inside the oil container are two small wheels which turn at very high velocity in the same direction. On wheel, which dips slightly into the oil causes the oil to be carried up and thrown violently against small ribs or teeth on the periphery of the second wheel, these ribs striking the drops and breaking them into a fine spray, which is mixed with air to form the explosive charge.

A general view in a German aeroplane factory. The photograph shows men, women, and boys at work.



A BREEZY SPOT.

FROM A DESPATCH RIDER'S NOTEBOOK.

IN this war there is one thing that gives the tired soul and the harassed mind a chance to recuperate, that is, a Divisional move—a shift from one part of the line to another. There is always the sporting risk that it may be a case of "out of the frying pan," but you chance that; anything for a change. I cannot convey in writing the fed-up feeling that comes over one at the horrible monotony of riding over the same roads for months, passing through the same ruined villages, and cursing at the same traffic blocks, at the same corners, using the same lurid adjectives, the only break in the monotony being when some gentle working party lay down stones a few feet deep to add variety to the only good road on your route. Then a little excitement creeps into your mundane existence, and an odd puncture tends to lighten the gloom. Thus only is "the trivial round, the common task," glorified.

Our division has at length shaken off the trammels of the Somme area. We have left behind that part of the line wherein I spent the most miserable winter of my existence, where for months we saw nothing but smashed villages and shell ploughed fields, where canteens were as oases in a desert (of mud), where the showers start on the first of the month and leave off on the 29th, where you ride the first day of the week and walk the rest, where "not a prospect pleases, and every road is vile," and, above all, where I lost sixty francs in two weeks playing bridge. We have put all that behind us; it is to me now like as a nightmare when one awaketh.

A Glorious Ride—and the Destination!

I had a glorious ride up from the South to the North. This is one of the blessings of a D.R.'s life, the big rides when the D.R.'s move; you take your time and go your own way. I stopped at Doullens on my way up, and had a good dinner. I had tea at St. Omer, where I saw for the first time some English girls dressed in khaki. I had no time to enquire what their particular job was, but I expect it is office work. There are too many stalwarts doing office work out here; it is about time they were thinned out. I got to my destination about nine o'clock that night, and found it situated in a wood, well within the shelled area. A thoughtful War Office had provided us with bell tents to ward off all attacks. These tents were painted like Indian *tepées*. It wasn't half a "windy" place. The Germans knocked out several chaps of one of our battalions the third night we were there, then the next night they gave us a bombing display from aeroplanes, but no one was hit. They again "found" one of our battalions, and badly wounded three men. There are some people who tell you that you get used to shell-fire. Well, I have never met any super-men yet, and I know I am far more "windy" now than when I first came under shell-fire at Loos.

A Warm Spot.

We have now moved up still further, and our headquarters are about 3,500 yards from the front line. You can see (from a mound near us) away back behind the German lines, and you can let your eyes feast on the sight of Fritz's second line being blown out of existence by our "heavies." Tall pillars of smoke, earth, and dust are constantly rising in his part of the map. Their war balloons seem to me horribly close. One of them looks right down the road where we are. This is the road to the communication trench to the front line; it runs at right angles to the line.

This is a warm shop. The shelling that goes on every day from both sides is cruel. You dare not walk about without your shrapnel helmet and your box respirator. It's risky to make a dash to the cook-house only 100 yards away. Fritz varies the monotony of 5.9's and 8in. by giving us liberal doses of light and heavy shrapnel.

My sleeping place is in an old house. The room has iron girders round it, and is well sandbagged.

Fritz dropped a 5.9 opposite the door a few evenings ago, but I was out at the time. Some of the fragments came through the door and "did for" my box respirator, that (like a fool) I had forgotten to put on. A small piece went through the face part, making the respirator useless.

The explosion of a 5.9 baffles description. It's the most awful shell I have ever heard. It comes down with a horrible scream that simply demoralises you. Then follows the fearful, shattering cr—ash. The echoes go rumbling away, and can be heard for miles. The pieces fly around, and you're not safe (unless it drops in very soft ground) within a radius of 400 yards.

I was in the cook-house when the first one dropped. The second went over and hit an R.E. dump and set off several hundreds of "Very lights." One of these fell on a barn near by, and the thatched roof was soon alight. It blazed up fiercely, and Fritz, seeing the smoke, shelled that spot for over an hour. This is an "old stunt" of his when he sees any smoke or flames. Knowing he has hit something he makes it a rule to vent his hate on that particular spot.

Getting the Wind up.

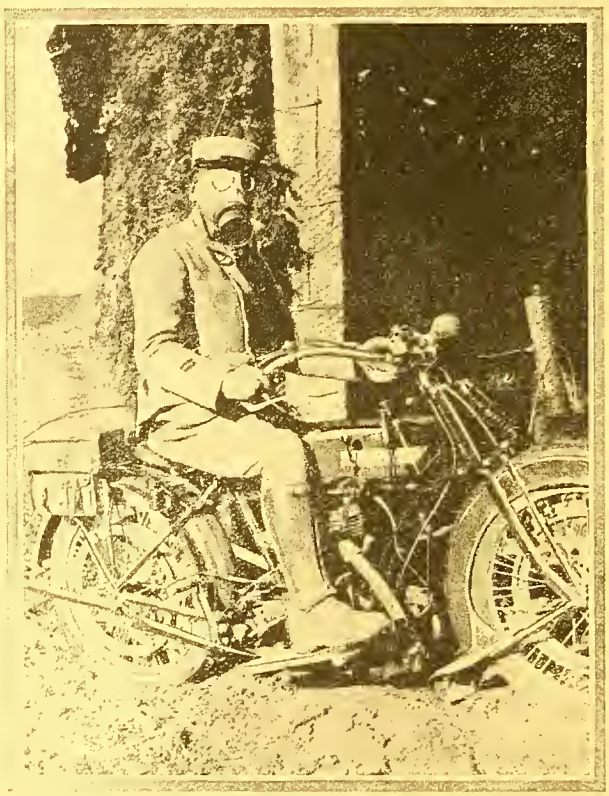
I had a run back to one of our battalions (resting) a few nights ago. Coming back about 11.30 (no light, of course) I was stopped on a switch road, and had to wait half an hour before the shelling stopped. When all seemed quiet I went on in fear and trembling.

A Breezy Spot.—

The engine explosions give you little chance of hearing a shell coming. The first notice you get is the shattering crash, so I will leave you to imagine the funk I was in as I rode over that portion of the ground Fritz had been shelling. It was a bad road, and I had to go on second gear. I got through all right, and, as is the case out here, forgot all about my terror when I had arrived back and had lit a pipe. This is one of the worst spots I have ever been in owing to its exposed position. If I travel by the main road to the left I have to come round a very bad corner, and he "bumps" that corner constantly. If I go the other way (to the right) I have to pass some "heavies," and these "heavies" are to the Germans as is a red rag to a bull. Fritz pays them more than their proper share of attention, in the shape of 5.9's, and as these guns are on the side of the road that I would have to travel, well—

That leaves me a mud road (switch road). It lies almost opposite. By going one way (possible only in dry weather) I certainly dodge both bad spots, but even this road is not safe, for quite recently a big howitzer has been planked in a field close by, and that makes for trouble.

To pass a big howitzer when it is firing is another "windy" job, especially on a dark night when you are not expecting it. You are riding along, picking your way slowly in the dark, when suddenly at your ear there is a deafening explosion, and a big tongue of flame shoots out from the darkness. Whew! You simply don't know where you are for several minutes. The first question that arises in your mind is, "Was that ours or theirs?" Then the big gun looms up in the darkness, and all is peace. It seems to me that these gunners wait until some unfortunate D.R. comes close to the gun and then they fire it.



ON THE WESTERN FRONT.

A French despatch rider wearing a gas mask in a zone frequently shelled with gas shells, on the French front.

The D.R.'s Puzzle.

One of my night runs will stand out clearly in my memory for many months; but meanwhile the reader will doubtless wonder (as I have done for years) why it is so many despatches have to go out at night. Well, it may be that the good dinner of which the staff partake is an incentive to clear thinking, or it may be other things far beyond the comprehension of a mere D.R.; but, whatever it is, it is a nuisance, especially here, where you dare not use a lamp, and where the roads are full of holes. Heaven help the crank cases!

Fritz and the Gas Shells.

On one particular night I set off at ten o'clock for a quarter of an hour's ride. This may seem a very short run, but to me it was a quarter of an hour too long. I got to my destination—it was one of our brigades (resting)—and jogged back in high spirits. Half-way back, coming along the famous mud road, I spied in the darkness some soldiers running towards me. They pulled me up, and I found that Fritz was putting over a big supply of gas shells. They were falling, I was told, all round our headquarters and near the road I was on just where it meets the main road. This was pleasant news. My useless respirator I had left behind. I turned back to the brigade I had just left. There I got through on the telephone to my headquarters, and was told to keep away for an hour. About 11.30 I started back. I had in the meantime got the loan of a respirator (the old pattern). I could not wear this and ride at the same time, as it is almost impossible to see in the dark with a respirator on. I was again stopped on the switch road, and had to wait till one o'clock until Fritz had finished his "gas stunt." Hearing no more gas shells falling I chanced riding on, and got back safely.

A gas shell in its passage over makes a peculiar whirring noise, and there is no explosion. It hits the ground with a dull thud, very much like a "dud" shell—in fact, when first I heard one I thought it was a "dud," but when your eyes begin to smart and you get a dull pain in your forehead you soon know the difference. I got down to it about 1.15, but had not been asleep an hour before I was roused by the "gas sentry." More shells coming over. I went out to the door, but could smell no gas. I put on my respirator for about five minutes, and then went out again and had another sniff. No gas; the shells were no longer falling. The wind had most fortunately changed in our favour, so I went back to bed and slept soundly.

What with ordinary shells, extraordinary shells, and gas shells, this is a bright spot, but "*c'est la guerre.*" In fact, it is very much "*la guerre,*" and I am being continually reminded of Bairnsfather's brilliant parody, "*C'est la guerre mais ce n'est pas magnifique.*"

H. B. GUNN.

THE MOTOR CYCLE

AVIATION SECTION

THE HUNS IN THE CART—AND IN THE AIR.

A Dashing French Airman.

Nungesser, the famous French "ace," brought down his forty-fourth aeroplane recently.

Richthofen's Diary.

This interesting book, recently reviewed by "Torque," is published under the name of the "Red Air Fighter," and may be obtained from the publishers of *The Motor Cycle*, price 2s. 9d.

The Spinning Nose Dive.

A correspondent raises the point as to whether a spinning nose dive, which is usually performed with the pilot's head towards the axis of the spiral, can be carried through in the reverse position, i.e., with the undercarriage towards the centre. This inquisitive person also asks whether a pilot can reverse the direction of spin and still continue to dive. Perhaps "Torque," or someone else in the know, will elucidate.

Lt.-Col. W. A. Bishop.

The flying exploits of Lt.-Col. W. A. Bishop, V.C., D.S.O., have thrilled the world. Officially he is credited with seventy-two enemy machines, but, as a matter of fact, he recently visited the Front to complete his hundred. He is now engaged in the formation of an exclusively Canadian Air Force. Canadian flying men for a long time have been extremely desirous of having an organised Canadian Flying Corps to operate in the field, and are also looking to the development of the air service after the war.

Bombing a Transport Column.

A British two-seater machine hovering at night over an enemy concentration centre observed, easily distinguishable in the bright starlight, a column of transport consisting of about twenty waggons. Descending rapidly to 300 feet, the pilot landed two bombs, a hundredweight apiece, plumb in the centre of the column. The destruction was enormous, and the remnant of the column scattered wildly in all directions. The British pilot rose again and waited, giving time for the German transport to reassemble. Diving once more, he found it, together with two other large lorries, in a sunken road, where the Huns apparently hoped to escape further attack from the death-dealing raider. The British pilot released his remaining bombs from an altitude at which he could not miss his target, and then, diving lower still, opened fire with his machine guns, putting about 250 rounds into the confused mass of wreckage.

German Officers' Plans Flouted.

Two young German officers who escaped from Sutton Bonnington Camp told their captor that they hoped to discover an aerodrome on their way to the coast, and, by seizing an aeroplane, fly to Germany. One of the prisoners had a map and the other a compass.

A Thin Time for German Sausages.

German observation balloons have had a bad time recently. One British pilot, scouting behind the enemy's lines, pounced on two of these balloons in swift succession, and succeeded in setting fire to and destroying both. His petrol was beginning to run low at the time, so he returned to his aerodrome to refill. He set out immediately upon a second quest, sighted two more balloons, and, taking advantage of friendly clouds, carefully stalked them. When within a short distance of his prey, cloud cover failed him, and he was perceived. The Huns rushed to the winches, and endeavoured to haul down both balloons. Putting down the nose of his machine, the British pilot sped earthwards after the swaying mass of fabric, and almost before the German mechanics had their winches working the hunter had secured his first quarry, which fell a blazing mass upon the Huns beneath. The other balloon was rather farther away, and the Germans hauled desperately, and succeeded in getting it down almost to the ground before the British pilot arrived above. In spite of furious fire from below, he dived low enough to pump in a burst of incendiary bullets, and had the satisfaction of increasing his bag for the day to four enemy balloons totally destroyed.

Stopping a Petrol Leak in Mid-air.

A British machine working in conjunction with the infantry was attacked by four German scouts. The British contact machine is not primarily designed for fighting purposes, but the pilot gave such a good account of himself that one of the attackers was speedily sent down out of control. During the fight the petrol tank of the British machine was pierced, bringing instant menace of its destruction by fire. Thereupon the English observer promptly climbed out on the lower plane and successfully plugged the hole with his handkerchief, remaining on the plane until his pilot succeeded in throwing off his pursuers and landing his machine safely behind the British lines.

The Pfalz Single-seater.

This new type machine has its most novel feature in the fuselage, which is simply a light wooden framework without any bracing, covered with two skins of three-ply wood arranged specially in different directions. The undercarriage is of streamlined steel tubes, and the shock absorbers are actually of rubber.

A crashed German Gotha and the bomb intended to be dropped by it.

Hun Aeroplane Wastage.

By X.Y.Z.

THE Paris correspondent of the *Morning Post* recently published a semi-official French estimate of the enemy's consumption of aeroplanes on the Western Front: his figures form an interesting appendix to "Torque's" recent disquisition.

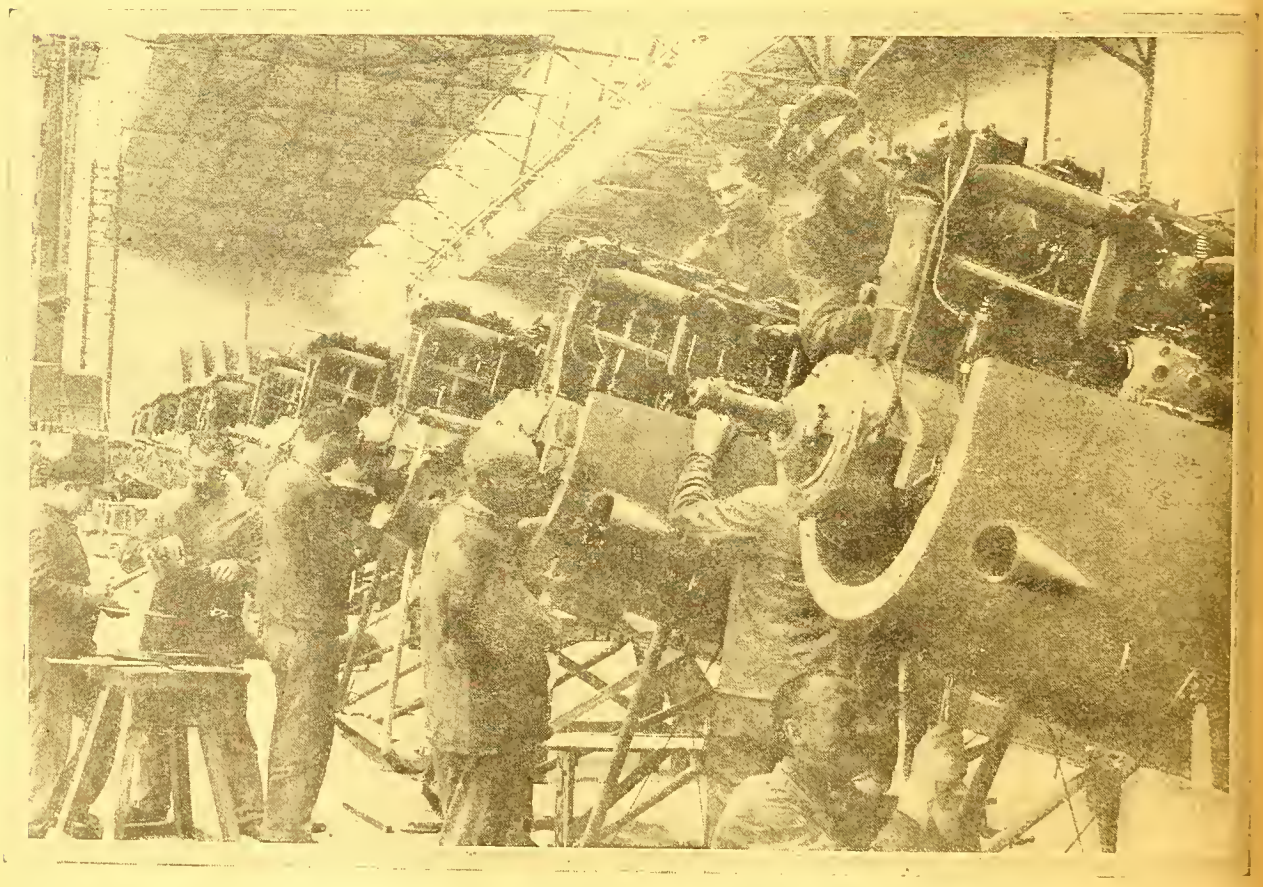
According to the source quoted, Ludendorff disposes of squadrons totalling from 2,600-2,700 aeroplanes and about 2,000 pilots on the Western Front. Every month he loses approximately 75% of his machines and 50% of his pilots. At times the loss on lively sectors far exceeds this proportion. According to the *Pall Mall Gazette*, the Hun began July with 338 planes allotted to the sector on which the French were active; and 293 of these were officially crashed by July 31st. Averaging up his aerial losses along the entire Front, he loses 900 machines as observed victims to Allied pilots, and as many more as the results of bad landings, bombing raids by the Allies, and "crashes" which are not viewed by Allied observers. His 2,600-2,700 machines at the front aerodromes are classified as follows:

Single-seated scouts	1,100
Two-seated reconnaissance	1,100
Infantry contact machines	250
Bombers	200
	2,650

Losses of 1,800 planes per month indicate an annual wastage at the Front alone of 21,600 machines and of from 10,000-15,000 pilots. In addition to this front line wastage, a great number of crashes must be allowed for in training. School machines have their more vulnerable details very substantially constructed, especially the undercarriage: and it must not be supposed that every training crash means a "write-off." Still we may not be very wide of the mark if we estimate that every pilot inflicts more or less serious injury to three aeroplanes during his training, and that on the average one of these three machines is too seriously damaged to be worth repair. On this basis the training wastage will amount to approximately 12,000 aeroplanes per annum. In other words, the Hun is using up at least 30,000 aeroplanes per annum, and, as we outnumber him in the air at last, our own construction is apparently still more formidable.

The creation of a special fleet of 10,000 bombers would thus imply an impossible increase in production: and we must rely largely on the American programme for any giant stunt of this character.

If ever such a fleet were to materialise there is no doubt that it would play an important part in ending the war. But we must still wait.



In the fitting shop of a German aeroplane factory. A line of aeroplanes having engines adjusted

"DUD DAYS."

"THE weather yesterday was unsuitable for flying, and there was no fighting or bombing on our front." But you cannot really dogmatise about flying weather. "Topping day for a flip," says the cadet pilot enthusiastically; but the instructor with the gold stripe on his arm looks sourly upwards. There is certainly no wind, and the sky is blue enough in parts: but there is a drift across the air at 10,000 feet, and a thin film of haze is floating over. Before a machine could get high enough to cross the lines, the ground would be absolutely invisible. You would have to come down low every now and then to find out where you were; and it is long odds that on one of these sighting dips you would put your nose into a nest of expectant Archies.

* * * * * *

Well, surely nobody could quarrel with to-day? The clouds are so high you can hardly see them, and the vault of heaven is blue. Again the instructor grunts. Archibald can see everything between ground level and 20,000 feet as a clear-cut silhouette. It is a perfect day for ranging, and those scattered clouds are pretty steady: the Hun can register on them before the real targets come along. Perfect day for flying? Say rather a perfect day for the anti-aircraft guns.

* * * * * *

No flying to-day? No, because we are only an elementary training squadron. Some day you will go up in just such a low-hung cloud smother as this. Good "push" weather, you know. The field guns have to fire blind with these mists about—why, nobody could see across No Man's Land. If you could multiply the number of squadrons by ten, this would be the only kind of weather anybody could attack in. Then out must go the flights, bombing, and machine-gunning troops and transport from fifty feet up, dodging church steeples and poplars and little hill-at a hundred miles an hour, when the pilot can hardly see fifty feet ahead. Rain? Oh yes, and hail too, stabbing any naked patch of face like steel darts, eating away the propeller till it looks like a couple of toothpicks stuck on opposite sides of a bread trencher. How do you know where you are? By the uniforms beneath you. If they are grey, you are over the Hun lines; if they are khaki, you are over ours. Hang the weather. The Flying Corps never let the infantry down.

* * * * * *

What is good flying weather then? There is not any at the Front. If it is clear, look out for Archie. If it is thick, Fritz will try to ambush you. If it is very thick, you will impale your 'bus on a church steeple. If the wind blows easterly, you can hardly get across the lines. If it blows west, you can get out, but you cannot get back. How many times have I crossed the lines? Oh, about five hundred, I suppose. What sort of day did I fly on? Oh, any old sort. They are all "dud."

TORQUE.

A ROOM FIVE MILES HIGH.

IN the early days of the war a few young pilots under training "crashed" in mysterious circumstances. They appeared to lose control of their aeroplanes, although experts could detect nothing amiss with the control surfaces. Moreover, they "crashed" from heights which gave the machine every chance to assert its inherent powers of recovery; the accidents thus suggested that the pilot had fainted and collapsed forward on to the joystick. As time went on it became quite clear that a strong physique of a particular type was necessary for withstanding the strains of high altitude work, and in particular that rapid descents of several thousand feet test the anatomy very severely (ascents, being compulsorily more gradual, are less exhausting). The medical tests of would-be pilots were gradually stiffened up, and these mysterious accidents are now practically unknown. It is a feather in the physicians' cap that they are able to deduce from the results of a ground level examination whether a particular candidate can stand lightning dives of 5,000 feet or not.

The Vacuum Cabinet.

According to the *Scientific American*, a Chicago doctor named Chas. M. Robertson has recently patented a vacuum cabinet, in which an embryo pilot's capacity for standing sudden and violent changes of air pressure can be tested; the inventor asserts that his cabinet will "plough" 25%-30% of the pilots who succeed in passing the ordinary deductive examination.

The cabinet is built of steel plates, and contains a chair on which the candidate sits. By means of powerful pumps the atmospheric conditions in the cabinet can be approximated to those encountered by pilots in climbing to a height of five miles, and the pressure can be varied so rapidly as to reproduce the effects of a dive of 6,000 feet in thirty seconds, *i.e.*, of a prolonged vertical dive at 150 m.p.h. The physician watches the candidate through a heavy glass window, and can detect from his face if he is hopelessly unsuitable for high altitude work. A mercurial scale on the outside of the cabinet registers the vacuum in terms of altitude.

Going Through It.

When the pumps are operated to reproduce the effect of a long dive at 150 m.p.h. an unsuitable candidate may show by the greenish pallor of his face that he is suffering from vertigo. In extreme cases signs of syncope or motor paralysis may appear. Should the candidate pass through the tests without evident discomfort, he is seized by the doctors when he emerges, and subjected to the ordinary instrumental tests, which may still cause him to be rejected.

It would be interesting to know whether Dr. Robertson varies the temperature of the air in his patent cabinet. Many pilots assert that they can stand any altitude provided they are warm, but that 1,000 feet in the naked seat of the old Maurice Farman on a cold day was more than enough to make them feel faint.

A GLOSSARY OF FLYING TERMS.

In the interests of those motor cyclists who are not very familiar with the names given to the various parts of an aeroplane and other terms used by the Air Services.

(*Continued from page 220, September 5th.*)

GAP.

The vertical distance between the upper and lower planes of a biplane, or the various superimposed lifting surfaces of a multiplane. The gap must be sufficient to prevent air disturbed by either plane from "interfering" with the relations between the other plane and the air which

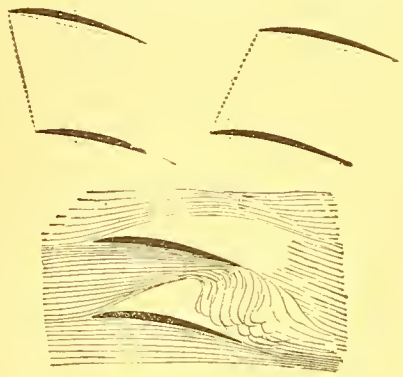


Fig. 1.

it engages. As a wide gap necessitates tall interplane struts and long wiring, with consequent increase of drift and weight, "interference" is often avoided by a "stagger," *i.e.*, mounting one plane with its front edge vertically in front of the other. Such stagger may be either "forward" or "backward" stagger. (Fig. 1.)

GAP-CHORD RATIO.

The ratio of the width of the gap to the length of the chord. If the gap be less

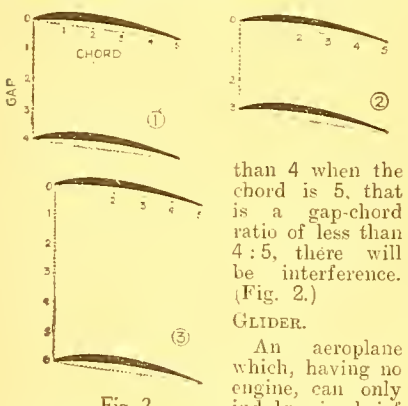


Fig. 2.

than 4 when the chord is 5, that is a gap-chord ratio of less than 4 : 5, there will be interference. (Fig. 2.)

GLIDER.

An aeroplane which, having no engine, can only indulge in brief flights down the face of a slope, securing its thrust from gravity in the teeth of a steady breeze. Until petrol engines became light enough for use on aeroplanes, the practical study of the problems of flight depended wholly on the use of gliders. Pilcher, Lilienthal, and the Wright Brothers corrected and expanded their theories by many experiments with gliders.

GLIDE.

(Verb.) To make a descent with the engine out of action. Aeroplanes are usually designed to fly "slightly nose-heavy," when the engine is either stopped altogether or throttled down to a point at which it furnishes no useful thrust. This angle is so set that the rate of descent will be approximately equal to the normal flying speed, and the reaction procured by gravity from the air is sufficient to support the machine. Thus if a pilot, flying at, say, 10,000 feet, throttles down his engines or switches it off, and puts his

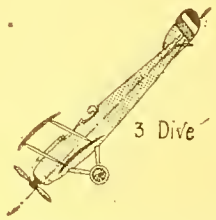


Fig. 3.

controls in neutral, the nose of the machine will dip, and it will glide down earthwards at a safe angle. The term "dive" is properly reserved for descents at a steeper angle, either procured deliberately by the use of the elevators, or caused by unwelcome circumstances, over which (at least, at the moment) the pilot has no control.

HANGAR.

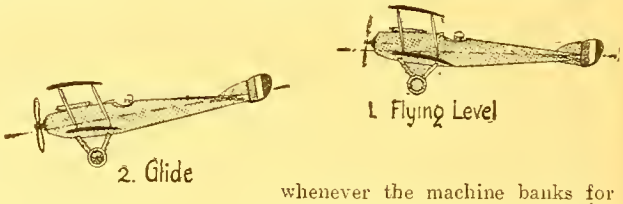
The shed in which an aeroplane is housed.

HELICOPTER.

Either an aeroplane sustained by propellers revolving in the horizontal plane around vertical axes, or, alternatively, a propeller revolving round a vertical axis. There is no aeroplane of the helicopter type in existence. The nearest present-day approach to the application of the helicopter principle in actual principle occurs when a light scout machine, equipped with a very powerful engine, climbs vertically for very brief periods. This position occurs for a fractional moment of time in looping the loop, and for a longer period in occasional brief stunts. It is not, however, a true application of the helicopter principle, which requires that the aeroplane shall hang suspended from its revolving airscrew. In the examples quoted, engine power unaided is insufficient to maintain the machine in the indicated position, which is attained by engine power supplemented by a temporary and colossal momentum or impetus. As soon as the momentum is exhausted the aeroplane ceases to support itself, and so the apparent helicopter action is really more due to momentum.

HORIZONTAL EQUIVALENT.

The horizontal equivalent of the leading edge of a plane is obtained by dropping perpendiculars from its tips to meet a horizontal ground line. The lift of a plane varies as the horizontal equivalent. Consequently, when a plane is tilted out of parallel with the ground in making a turn, the plane loses a portion of its lift. If the right and left-hand planes are mounted on the fuselage with an angle slightly less than 180 between them on the upper side the horizontal equivalent of the upper wing will shorten appreciably



whenever the machine banks for a turn. This wing will therefore momentarily possess less lift than the lower wing, and the lower wing will tend to lever the machine back on to a level keel.

INCIDENCE, ANGLE OF.

The angle at which the lifting planes attack the air. (See *The Motor Cycle* for February 14th, page 156, for description with sketches.)

INCLINOMETER.

An instrument for measuring whether an aeroplane is inclined laterally or not, *i.e.*, whether one wing tip is higher than the other. (Instruments which register the longitudinal inclination are usually called "gradometers.") Various forms of instrument are employed, including suspended bobweights. U tubes filled with liquid, and arched spirit levels. It is easy to manufacture an instrument which will give an accurate reading when the aeroplane is flying straight ahead with one wing slightly drooped; but if the aeroplane is banking for a turn, centrifugal force affects the instrument, and causes it to give an incorrect reading. This defect alone would not matter very much, as an instrument which indicates "level" when the machine is banked to exactly the right angle for each turn is quite useful. The real trouble is that such instruments will not give any legible reading at all when the aeroplane is being buffeted about in a storm at night, or when the pilot is lost in a cloud and cannot hold a course. In other words, all existing inclinometers let the pilot down under the only conditions when an expert pilot really needs their help.

INSTABILITY.

As applied to aeroplanes, a tendency to yield to a disturbing force, and to quit the original course. Stable and instable aeroplanes each have their advantages.

FRONT WHEEL TRAIL.

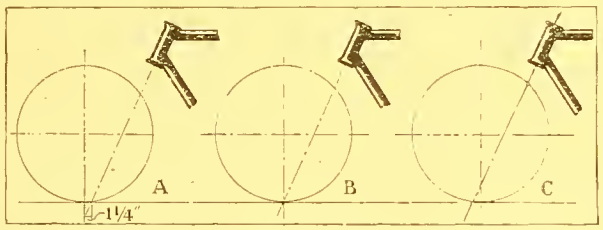
Some Interesting Notes on a Point in Design upon which many Designers are at Variance. By A. van der Mee (The Hague).

In publishing a short article on this important point in connection with motor cycle design, we do not necessarily agree with all the contentions of our contributor. Mr Mee, however, has closely studied the question which is debated here, and is the inventor of the Mee spring fork, which we illustrated in the issue for August 8th, when this young Dutch engineer dealt with spring fork design. The present article should be read in conjunction with Mr. Mee's previous contribution.

TO the uninitiated it is, perhaps, necessary to state that "the trail" of the front wheel of a motor cycle is the distance from the point where the wheel rests on the ground to the line produced through the centre of the steering head. There seems to be a general tendency to believe that the centre line must meet the ground in advance of the point of contact of the front wheel on the road; in other words, that the trail must be positive in order to obtain comfortable steering for solo machines, and that for easy steering on a sidecar machine the trail must be zero.

The Zero Trail.

In order to test this idea I have ridden solo machines with all degrees of trail, and have found that the machines which have steered the best were those with no trail at all or with a negative trail. The latter one was by far the easier to ride hands off, despite the fact that often it is asserted that a machine so built would be very difficult, if not quite impossible, to ride solo.



Diagrams illustrating negative, zero, and positive trail of the front wheel.

I must admit that I do not think a negative trail a very practicable proposition, as, should the front wheel become locked for some reason, it might be really dangerous. When the trail is negative and of some measurable dimension a front wheel brake must not be fitted. However, if we can make machines with a trail that is zero, it will swing around the value zero when the wheel springs. As may be appreciated, the results of my experiments on the road were full of surprises, and I found that the advantages with which it has been the rule to credit the positive trail are of little, if any, use.

When the bearings of the hub are in good condition the force necessary to turn the wheel round the axle is negligible. This force works at the point of contact of the front wheel on the road. So, when the trail is positive, the force will try to pull the wheel upright, but when we ride in a straight course, as most of our riding may be called, the force works in a plane, in which plane is situated the axis, around which the wheel must move (*i.e.*, the centre of the head) as well; so the force cannot give a feeling of safety.

The Positive Trail.

A machine with an excessive positive trail does not steer more easily than one with a small positive trail. The reasons for making the trail positive are trifling. Apparently there must be a reason of far greater importance making for easy steering when the trail is not positive.

Many readers will know that the most expensive cars are fitted with inclined steering-pivots. With a car so made, when the wheels are moved to deviate from the straight course, the front axle is caused to rise, and the weight of the car on the front wheels tends to press the wheels back, with the result that the weight on the front axle tends to produce automatic steering on a straight course.

Diagrammatic Representation.

To find a parallel to this resulting from the rake of the head, we draw a circle representing the outline of the tyre and a centre line of the head with an arbitrary rake of the head and a positive trail. We project the wheel on the plane of the paper, when it is turned out of this plane under several arbitrary angles around the centre of the head. Then the wheel presents itself as an ellipse, of which we construct, for all the positions, the lowest point, *i.e.*, the point which rests on the road.

All these points make a curve of the following shape: First the curve goes forwards and upwards, then it reaches its highest point and falls downwards again, still going forwards: then it goes sharply downwards and turns backwards a little, the appearance differing with the rake of the head and the trail. We make such a curve for all sorts of trails. As long as the curves begin to go upwards (*i.e.*, as long as the trail is positive), this means that the weight on the front wheel is pushing the wheel out of the straight course, until the wheel has turned around the head to an angle corresponding to the highest point of the curve. (The front wheels of different push-bicycles do not fall as much out of the straight course.) To eliminate this we must make the trail zero or negative. We do not wish to make it negative for reasons mentioned before. So we must make it zero. Then the tendency of the wheel for falling over is eliminated.

From experience I know a machine so designed is not bad to steer; in fact, it handles more easily than a machine with a positive trail.

Balancing a Bicycle.

Balancing a cycle (also when placed on rollers, as kinematically this alters nothing in the situation) is only taking care that the resultant of the centrifugal force (which only acts when taking a corner) and the weight of the machine and rider cut the line of support, which connects the point of contact of the front wheel on the road to that of the rear wheel. This is

Front Wheel Trail.—

easily done on the road by means of the steering, and the value of the trail has nothing to do with it.

I once read the following reason given to prove that a cycle with a negative trail must be unrideable: "This condition of unstable equilibrium (when riding a cycle with a negative trail) is easily realised when a pedal-bicycle is wheeled backwards without holding the handle-bars."

Apparently the writer did not realise the fact that when you ride the machine backwards not only the trail becomes reversed, but the rake of the head also, and it is not suggested that this is altered. The force necessary to push the front wheel (not to turn it around the axle) works at the hub, and always would tend to turn the wheel around the head (except when the trail is positive and so great that the centre line of the head cuts the axle or comes in front of it) were it not that the force is working in a plane with the head, as mentioned above, but this is never mentioned when the necessity for a positive trail is explained. To see if the trail is about zero it is necessary to draw a line on the ground at right angles to the plane of the front wheel and exactly under the axle, using a plummet. A small nail should be driven in the ground on this line, and a string fastened to the nail, and held up by an assistant about parallel to the head. When standing at some distance (on the line), the investigator will soon get an impression whether the trail is positive or about zero, which latter value is good enough, since the trail always differs when springing takes effect.

The Effect of Weight on Balance.

When jacking up the machine to try whether a force, working at the lowest point of the wheel, can turn the wheel around the head, care should be taken that both wheels are the same height from the ground. One wheel should not be on a stand. It does not matter very much if a heavy lamp is on the bars provided it is placed in the middle. Of course, the lamp descends in relation to the cycle when the bars are turned, but only very slowly at first, whereas the whole machine rises (when the trail is zero), and rises more quickly as the lamp falls. The same applies to other heavy things in front of the head, *e.g.*, the whole front wheel. But with heavy accessories placed at the side of the bars the effect is not so harmless. These things fall quickly when turning the bars, but light accessories, well distributed, have no influence of any importance. The best place for such things is, of course, behind the centre of the head.

GUARDING AGAINST RHEUMATISM.

Useful Hints for All-weather Riders, based on War Experience.

THERE are few men who have served with the Forces for any length of time as motor cyclists, suffering privations rather above the ordinary during the months of wet and cold, who do not suffer to some extent from rheumatism or similar complaints at regular or irregular intervals. Quite apart from the inconvenience of such attacks, which rob work of any pleasure it may contain and detract from one's value in that the lightest task becomes a labour, it is advisable to guard in the best way possible against indisposition of this kind for the sake of the future. Ordinarily the attacks, though bad while they last, are quickly forgotten, and one slips back into the old easy methods, taking quite unnecessary risks, and entirely ignoring the fact that if the disease now obtains a proper foothold, as it may, one will most assuredly have to pay for the neglect in years to come. If, on the other hand, one now takes proper care, the attacks are likely to be less frequent and less severe, and on returning to civilian life they may never again prove a source of inconvenience.

Damp Outer Garments.

The most common locality for neuritis and rheumatism among motor cyclists is in the arms and shoulders, these members being most exposed to the driving elements and the full force of the wind, and one of the first things to guard against is damp outer garments. I am inclined to think that one reason why motor cyclists suffer probably to a higher percentage than any other soldiers from rheumatism is because they get their outer garments thoroughly wet, return to a warm dugout, and after an hour or so again don their still damp garments and go out into the wind. There is nothing like a damp trench coat or British warm for causing rheumatism in the arm and shoulders, and therefore the first thing to guard against is the donning of only half-dried outer garments. The best plan is to keep, say, a trench coat and a waterproof: wear the trench coat whenever possible, and keep it when not in use on a hook near to the stove. When the trench coat is damp wear the waterproof in conjunction with a sweater.

Cold rubber or tarpaulin waterproofs are in themselves a cause of rheumatism unless something woollen and absorbent be worn under them.

Hands and Arms.

It is also very necessary to guard against draughts entering the sleeves, and to keep the wrists and forearms thoroughly warm. Long-sleeved vests, though many object to them, are essential for the winter months, as also are good gauntlets. It is not, indeed, a bad plan to wrap one's forearms from the wrists to the elbows with lint bandages, just as one laps one's legs with puttees, and, though many will doubtless smile on reading this, the day may not be far hence when they, too, will be glad to take any reasonable precautions against these old gentlemen's ailments, which to-day are taxing so many of the young.

Finally, keep two pairs of good woollen-lined gloves, *and keep one pair always dry*. Do not don damp gloves, which are almost as perilous as a damp trench coat. Keep your gloves in a warm place and wear them alternately.

I have found it a thoroughly good tip to don all my riding gear three or four minutes before going out, as in straddling the machine one is then comfortably warm. As "Road Rider" once pointed out, it is not a matter of keeping warm aboard a motor cycle, but rather of retarding so far as possible the start of the cooling-down process.

CHINOOK.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

ADDRESSES OMITTED.

Sir,—We have had a number of letters from Pte. B. Woodhall from Mesopotamia, also France and England, in each case without regiment and number, so that we are unable to reply.

We believe he is a motor cyclist, so that possibly a note in *The Motor Cycle* explaining the circumstances would bring the desired information.

A similar omission is not at all uncommon, as the number of telegraphic money orders we have had with no knowledge whatever of the sender, until we have received an indignant letter possibly a week or two after, is astonishing. We do not think we are over-estimating when we say 40% of such give no evidence as to the identity or the address of the sender. NORTON MOTORS, LTD.

IN CLOVER!

Sir,—I have read the remarks of "Big Twin" on riding "in clover," and note that he explains that his facts have come to hand very slowly.

If he will read an elementary work on botany, and try one or two very simple experiments, he will quickly find that his supposed facts are mere fallacies.

A clover crop is *wet* when compared with hay, simply because the leaves are thicker and contain more moisture, but that moisture is obtained from the ground and not from the air.

Let "Big Twin" try this. Take two jars of equal size and weight; put a bunch of clover in one with a supply of water, and in the other put water only. Stand the jars one at each end of a sensitive balance, and add water until they exactly balance. Leave them for a few hours on a clear day, and then note the result. It will be found that the end of the balance on which the jar containing the bunch of clover is standing has gone up considerably, and that to bring it back quite a fair amount of water will have to be added, but if the theory of "Big Twin" was correct, the clover by "sucking water from the atmosphere" ought to *gain* weight. The experiment, which is a very common one, proves that plants take in water through their *roots* and transpire or give it *out* through their leaves.

Worksop. BOTANY.

PETROL FOR DISCHARGED SOLDIERS.

Sir,—*Re* the letter in *The Motor Cycle* by "One of the Old 'Uns," I should be pleased if the Petrol Control Department would only allow two gallons of juice for silver badgers, so we could have one joy-ride. We are crippled for our country; now what will it do in return?

Fakenham. CRIPPLED.

Sir,—I notice that the suggestion regarding petrol for discharged soldiers is supported by your correspondent "One of the Old 'Uns."

It certainly does seem a bit one-sided that the strong, sound men, who have earned plenty of "pin money" in the past, without incurring any appreciable risk to life or limb, should be granted petrol, though, I suppose, their claims are just, so I must not grumble.

However, if, through the medium of the "thrice blessed" "Blue 'Un," a "silver badger" could obtain half a gallon or so of the precious fluid per week it would undoubtedly stimulate the pastime generally, and I do not suppose it would prolong the war more than twelve months, which, in view of the fact that we are now in its fifth year, might make it a round half-dozen, thereby making it easier for the historian to chronicle.

Putting jokes on one side, the "all precious" "Blue 'Un" is a great consolation to us in our unhappiness; but, oh for a chance to enjoy a whiff of petrol and the open road!

J. COOPER.

Sir,—We heartily agree with "Pre-war Enthusiast" and "One of the Old 'Uns," and maintain that discharged soldiers who have done their bit should be entitled to an allowance of petrol with which to gain a little recreation, for we are sure they have earned it. If the munition workers are so keen on motor cycling, there is a splendid opening for them in France. We think that discharged soldiers are more entitled to a petrol allowance than munition workers.

B.E.F. TWO D.R.'S, R.A.F.

Sir,—Seeing that motor cycling munition workers and others are allowed to use their machines for holiday return journeys, surely discharged sailors and soldiers ought to be allowed the same privilege, or are munition workers more worthy of consideration than the men who have done their bit? I do not begrude the munition workers this concession in the least, and hope they will enjoy their holiday, but why not include all those who have earned it?

St. Columb Minor. ONE WHO HAS SERVED.

BICYCLES.

Sir,—Your contributor "Road Rider," in your issue for September 12th, uses the word "push bicycle." May I ask you to point out to him that this prefix is totally unnecessary, and that he is merely displaying his ignorance of the English language? Bicycle is the correct name, and he was writing about motor bicycles, so there could have been no confusion. It is careless writing of this kind that encourages the use of these odious prefixes, and I was surprised to see such a literary error in the columns of such a paper as *The Motor Cycle*.

R. C. GREGG.

[We cannot agree with our correspondent that "Road Rider" is guilty of a literary error. He knows, and so do we, the original meaning of the word "bicycle." But a motor cycle is frequently designated a bicycle, as it most certainly is, therefore it is sometimes necessary to add the prefix to which our correspondent objects for the sake of clearness, and that our readers may be in no doubt as to which type we refer.—ED.]

THE THREE-JET BINKS CARBURETTER.

Sir,—I must confess to being sceptical about Mr. Binks's ability to tune out the dead spot in his carburetter satisfactorily. I do not see how one can eliminate by tuning a fault so obviously incorporated in the design. I have handled a goodly number of these instruments, and find that the dead spot is always there if the main jet is large enough to give satisfactory running when all out. The dead spot can be partially overcome by fitting a smaller main jet, but this results in blowing back when all out.

I have never experienced a dead spot due to too weak a mixture, unless one can call the all-out position a dead spot when a smallish jet is fitted or when the weather suddenly turns colder before one has time to change the jet. I should like to suggest to Mr. Binks that a rim round the air gauze is necessary, as I find that the first blow-back results in the disappearance of the gauze. Another little point is the bottom air slide fitting, which is very poor. As Dr. Lindsay says, this has little bearing on the running, and its presence is more or less immaterial—in fact, it usually falls off during the first week or so! but the screwhole left is an eyesore.

Birmingham. W.S.B.

TANGENTS OF OBSERVATION.

Sir,—The table of observation tangents given in *The Motor Cycle* for September 5th, page 217, is interesting to students, but not of much practical value. In the first place, the distances given seem to have been calculated without any reference to the atmosphere, and, therefore, no allowance is made for refraction. (There is a formula which gives the distance of the visible horizon for various heights, making this allowance, and I should be grateful to any of your scientific readers who would give us this formula. I cannot now put my hand upon it.) Secondly, any distance at which we can arrive by calculation must be greatly modified by the state of the weather and the clearness of the air. I should imagine the conditions which would enable a pilot to see the horizon 200 miles away must be somewhat rare, to put it very mildly. JOHN HOLLAND.

Sir,—On page 217 of your issue for September 5th, you refer to "Tangents of Observation." Does this mean that if the human eye were sufficiently good, an aviator at six miles altitude could see 217 miles? It would interest me, and others probably, to know the distance the human eye can see. I am not referring to star-gazing, because we then see stars thousands of millions of miles away, but, supposing a person stood on the summit of Snowdon on a very clear day, what is the distance he could see? Perhaps some learned fellow reader will answer the question. The first question, obviously, can be answered only by an aviator.
CURIOUS.

CYCLE CARS.

Sir,—In the issue for September 5th "Sergeant Mechanic R.A.F." stated his cycle car requirements, and I, and no doubt many others, especially manufacturers, would like to ask him if he is not asking a little too much for his money. Personally, I want a miniature Rolls-Royce for a hundred pounds, but I shall not get it; neither will "Sergeant Mechanic" get three speeds and reverse, electric starting, four wheels, and a spare one, etc., etc., for £130. Unless things alter very much peace model sidecars will be £130, and if we get three-wheelers at this figure we shall be extremely lucky. "Sergeant Mechanic" is one of the vast crowd who await the millennium, and while so many demand so much it seems hopeless for manufacturers to attempt to cater for the market. The enterprising maker who pares down a four-wheeler so that it will come inside, say, £130, will be despised by the very crowd he is working for as a vendor of shoddy goods. It no longer serves a useful purpose to remember the Humberette and the little Swift cycle car—they were marvellous value, but it is extremely doubtful whether they were what could be described as sound commercial propositions. Only their manufacturers can answer that point, but personally I do not anticipate seeing such machines again at anything near their price. In the meantime, the great majority of us will again invest in the good old sidecar 'bus, improved perhaps, but there are thousands like me who will prefer to spend £130 on a sidecar de luxe to risking the same amount in a four-wheeler that must be something built down to a price. Let "Sergeant Mechanic" think again, and schedule his requirements more in keeping with the times in which we live. TWO TRACKS.

"DUD" GEAR BOX DESIGNERS.

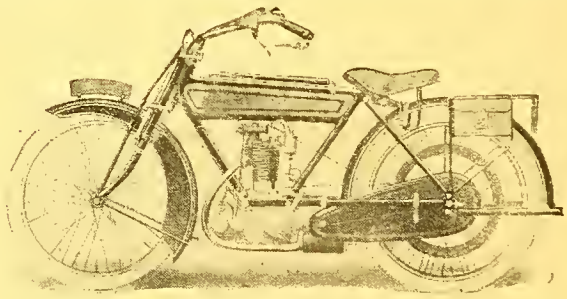
Sir,—I note "Ixion," in criticising American design, objects to the principle of interlocking gear change and clutch levers. Why, in the name of commonsense, so many manufacturers still cling to the old-fashioned type of gear box in which it is necessary to declutch before changing "up" or "down" I cannot imagine. These "three-phase" gear boxes are neither simpler, cheaper, nor more durable than such boxes as the Sturmey-Archer or B.S.A., and for the credit of their machines it would pay manufacturers better (if they are unable to design a "non-declutch" gear box) to pay a royalty to either of the above companies, or else buy their gear boxes. Every rider knows that although there is always plenty of time in which to change "up" there is often in an emergency only a fraction of a second in which to apply brakes and change "down," just time, in fact, to perform one operation, *i.e.*, push the lever into the low gear notch. To go through three operations in the time is quite out of the question.

According to your contributor and many other riders, a simply designed control is only suitable for "dud" drivers, hence their objection to American twist grip control, etc. To my mind, there is quite enough "tap twiddling" to do in the modern machine without adding unnecessary complications. The best designed machine is the one in which complete control is effected by the use of the least possible number of parts. "Ixion" should sit down and design a four-lever carburetter, a four-cylinder engine or some other (?) "improvement."

So long as "three-phase" gear boxes are used, the American system of interlocking levers is the most practical, as even the most experienced drivers make mistakes sometimes, and the great majority of buyers are not experienced.
M. HITCHCOCK.

CAMSHAFT OR CAM WHEEL.

Sir,—In "Vedette's" reference to the Diamond engine unit in his article "Camshaft or Cam Wheel" he scarcely does justice to this promising design. When your contributor mentions that the introduction of a camshaft does not simplify the design, he is, of course, only looking at it from this standpoint; but in this design other things than extreme simplicity were aimed at. First, the usually noisy chain as a primary drive is eliminated by the introduction of a short shaft. The second great point is that the gear box is integral with the engine which eliminates a chain cover, and it is possible to make a decent job of the chain case for the secondary drive because it does not have to cross a chain stay. In the writer's opinion, this is a very strong point, as most of the inconveniences of the average rear chain case are due to its complication, necessary because it has to cross from one side of the stay to the other. Another point which should appeal is that it is possible to expose the change-speed gear, the clutch, the timing mechanism, and the magneto drive by the removal of a single cover plate without disturbing the rest of the machine.



The Diamond motor cycle, showing the engine gear unit and chain case, which does not cross the stay.

From a manufacturing point of view the valve mechanism may not be so simple as that of one of the twins mentioned by "Vedette"; but, if the complete machine is considered, there is a greater element of simplicity than in most machines. With so many bevel gears, which are supposed to be power eaters, it may be imagined that their introduction is not justified; but, whatever disadvantages bevel gears may have, in this case their advantages apparently overcome their disadvantages. In any case, the machine has done very well in pre-war competitions. In the last London-Exeter trial it won an award as a sidecar machine, although the engine was only 350 c.c. capacity, and it is to be hoped that when the war is over it will make its re-appearance on the market as, undoubtedly, it is a design of great promise. ADVANCE.

["Vedette" made a plea for simplicity on the point of valve gearing, hence his remarks anent the Diamond.—ED.]

BRITISH AND AMERICAN MACHINES.

Sir,—I cannot let "Chinook's" letter of September 5th *re* "British and American Machines" pass unchallenged, for many of his statements are queer to say the least.

He says he has done his best to sooth numerous readers on this vexed question. It is a poor attempt at soothing by throwing ridicule at American machines.

Having had three years in France with the B.E.F. as motor cyclist and driver on the Ypres, Somme, Messines, and Cambrai fronts, also home and colonial experience in the motor trade, I think I can enlighten "Chinook" on several points where he seems to be woefully weak.

The demands of the Rev. A. M. Walmsley, of Ceylon, for spring frame, big ground clearance, 28in. × 3in. tyres, etc., I endorse as being essential for colonial conditions.

"Chinook" says: "The British programme does not include most of these things because most of us do not want them." Perhaps so—in England—but the colonial market has to be recognised. Whilst British manufacturers adopt "Chinook's" methods and omit these essential points from their programme their machines will fall far short of colonial requirements.

Further, he states: "I could mention several British spring frames every bit as good as the best American, but the makers have not yet decided to fit them, because they do not consider their wearing properties are up to the general standard of excellence hitherto maintained." A bold statement, but too frivolous to be true! If their wearing properties are not up to standard, etc., there must be a weakness in the design. The fact is that the British spring frame has not yet proved itself whereas the American has, under the worst colonial conditions. For years the chief selling point from the colonial standpoint was the spring frame. This is where the American scored every time, for, previous to the war, Britain could not claim to turn out many reliable and tested spring frames. It has been my experience to lose orders in the colonies for British machines, because I could not produce a spring frame mount, and to see the American agent step in and take the order and cash.

Again, he says big ground clearance and 28in. × 3in. tyres are features of many military models—A.J.S., Norton, Sunbeam, etc. I have read of these, but have never seen them. If they are placed on the Overseas market after the war I can see them selling upon arrival like hot cakes, for the colonial at heart prefers British machines, but, owing to the unsuitable models offered by the British manufacturers, he has been obliged to buy American machines because they could deliver the goods.

En passant, have these military models been satisfactory under Active Service conditions? I never saw one in France, or ever heard of one being out there. Perhaps someone could enlighten me as to how they stood up in Russia.

"Chinook" is wrong when he states that the other features are entirely a matter of taste. Conditions demand them. I go further, and state other necessary features—greater mudguard clearance, stronger front forks, stronger rims, and sundry fittings.

To say that the American system of clutch control is a chaos of bell cranks, cantilevers, and overhead hoists is really funny. [It was meant to be.—ED.]

Then "Chinook" says: "It is not a matter of the Britisher modernising his design." He is entirely wrong again, for I state from colonial experience (not from what I have read!) that the machine that suits requirements in England is quite unsuitable for colonial use.

No; we must look facts in the face and not be biassed. I am British to the heart, and prefer selling a British motor cycle rather than an American, but I must give the Americans the honours for marketing the machine most suitable for the colonial market. This is not "journalistic exaggeration" but knowledge gained from trade experience on the spot.

I confess to being one of those who has "glibly enquired" "Why does not the British manufacturer do this or the other? Is he asleep?" I maintain that the American has a far better knowledge of colonial requirements than the British manufacturers. The latter rely too much upon their past good name to sell their machines. That day has passed, for colonials are tired of their conventional methods, with the result that our American brothers are increasing their sales weekly. I have personal knowledge of this fact.

The old cry about American flimsiness and poor workmanship does not hold good to-day. Where is finer workmanship to be found to-day than on an Indian or a Harley-Davidson?

As a grand *finale* "Chinook" "seriously" states that "he would rather patrol 'No Man's Land' in stockinged feet with a lighted candle in his hair than work in an American motor cycle repair shop now being established in France." He gives the game away, for no sane man would patrol "No Man's Land" like that, for his light would be quickly put out in more ways than one, therefore it tends to prove his inexperience of American machines.

If during his campaigning "Chinook" has any leisure hours let him compare British and American machines from a more practical point of view, then I hope he will not be so biassed against the American product. F. R. HALL.

A SUGGESTED METHOD OF COOLING.

Sir,—I am an old reader of *The Motor Cycle*, and frequently see some comment or other on the overheating of two-strokes, and I suppose it is on account of that that we never see any over 2¾ h.p. on road machines. I have a suggestion, and as I am only a novice in such matters I do not know whether it is practicable or not, or more efficient than the present methods; anyway, here it is. First, we do away with the radiating fins, and just have the bare cylinder. Over this is the case made of metal, perhaps aluminium or other suitable metal. This case is made so as to fit about ¾in. outside the cylinder, and has a clamp to tighten up just above the exhaust port of the cylinder, and around it at the top of the casing is a hole, say 2in. diameter, so that the sparking plug goes in the centre of the hole through the casing, at the bottom of the casing and the most convenient side to drive is a hole, say 2½in. diameter, with a small fan fitted in which is driven by strap or chain off the main shaft. The fan would draw air through the casing, and as the plug and cylinder head get the cold air first I fancy it would be an advantage, as naturally the engine would be forcibly air-cooled, and the cylinder head and plug would get what they require.

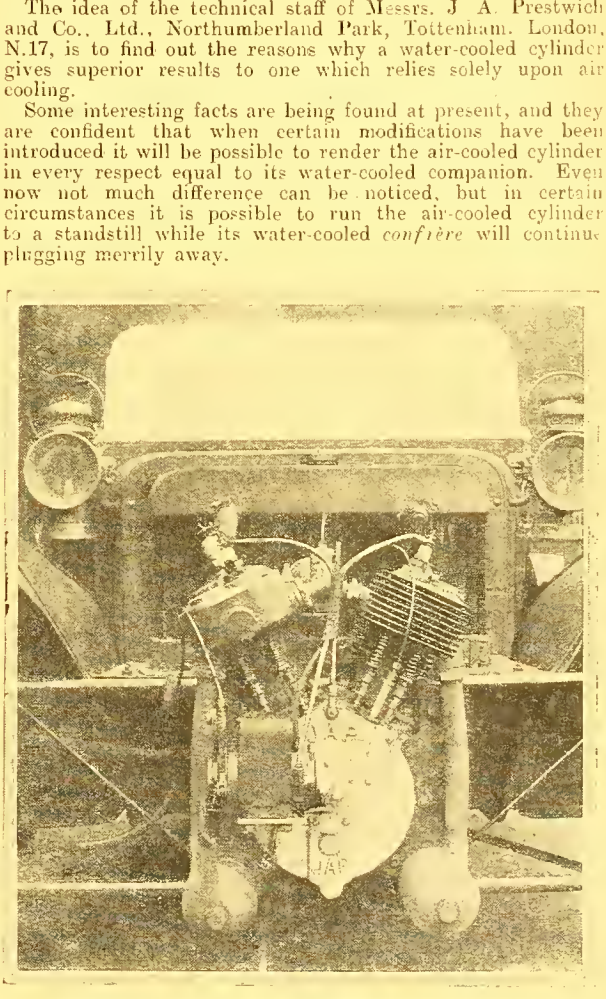
W. PARKINSON.

AN INTERESTING COMPETITION.

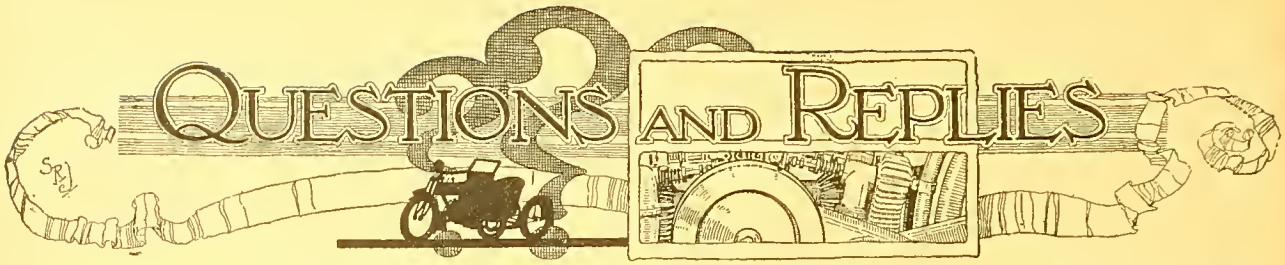
COMPETITIONS are rare these days. The accompanying illustrations show a test between an air-cooled and water-cooled motor cylinder on a J.A.P. engine attached to a Morgan, which is being run off at the present time.

The idea of the technical staff of Messrs. J. A. Prestwich and Co., Ltd., Northumberland Park, Tottenham, London, N.17, is to find out the reasons why a water-cooled cylinder gives superior results to one which relies solely upon air cooling.

Some interesting facts are being found at present, and they are confident that when certain modifications have been introduced it will be possible to render the air-cooled cylinder in every respect equal to its water-cooled companion. Even now not much difference can be noticed, but in certain circumstances it is possible to run the air-cooled cylinder to a standstill while its water-cooled *confrère* will continue plugging merrily away.



In double harness. An air-cooled cylinder being tested against a water-cooled.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Overheating.

I have a 1916 2½ h.p. two-stroke single-cylinder Calthorpe; overhauled thoroughly after only two to three months' use. I have only been riding it two or three weeks, but during the last few days I have had trouble. After riding it for about a mile it begins to vibrate loudly, grow very hot, lose power, and usually stops at the first hill. Will you, please, explain the reason? So far as I am aware it has not been damaged at all.—A.W.C.

We should say that the trouble is due to your using much too large a jet. Also look to your lubrication, which is a very important consideration.

Too Strong a Mixture.

I shall be glad to have your advice as to my motor cycle, which is not running as it should. It is a 2 h.p. Mark III. O.K. Junior. It does not run steadily, but seems to get a check every second or so. The carburetter seems free, and the inlet pipe from carburetter to engine seems also quite clear. Advancing or retarding the magneto does not seem to have much effect. It does not appear as if anything was loose about the engine, as when running down a hill with petrol lever almost closed there is practically no checking and quite regular running.—A.T.

We think a considerable improvement may be obtained by trying a slightly smaller jet. Probably running on too strong a mixture causes the erratic running of which you complain.

Pre-ignition.

I have a four-stroke 1914 twin fitted with an Amac carburetter (No. 25 jet), which runs well on the level with throttle and air about a quarter open. On shutting the throttle the engine still fires for some time, but when taking a hill and the throttle is opened up after a short period the engine slows down and finally stops. I have tried a No. 27 jet with the same result, but when new no difficulty was experienced when taking the same hills. Please tell me what is wrong.—W.M.S.

It is quite possible that the trouble may be due to the use of a plug, the points of which project too far into the cylinder and cause pre-ignition. We assume that you have ascertained that when the throttle lever is closed the throttle itself is shut.

Valve Queries.

(1.) I have the cylinders down of my 8 h.p. air-cooled Williamson with valves and valve springs in position. I have ground in the valves and fitted new springs. When I depress the valve stems, upon my gradually releasing the pressure on the stem I can feel that there is a certain amount of grinding taking place between the valve head and seating before the valve head again finally settles down correctly on its seating and makes a gastight fit. All four valves are affected in the same way. The grinding I feel is slight; nevertheless, I fear that all is not as it should be, and that imperfect running and excessive wear will take place. There is a shake between the valve stem and the guide of, say, 12-1,000ths of an inch when I grasp the stem at the cotter hole and shake it. Is it the valve guides that are a little worn, or valve stems, or both, and do I need to be concerned about it? If it is important that this should be rectified, what do you advise me to do? (2.) To ensure a perfect fit of piston rings in their grooves, what clearance between the sides of the rings and grooves is recommended in thousandths, and at what clearance in thousandths do they commence to be what is called a sloppy or bad fit?—G.E.H.

(1.) It would appear that you have left some of the grinding compound on the valves on their stems or their seatings. You do not say if you have taken care to clean the valves thoroughly before replacing them in the cylinders. The amount of play to which you refer between the valve stem and the guide is rather high, but is not at all serious. If the play gets very much worse the only remedy is new valve guides. (2.) We have communicated with the makers of the motor cycle, and they say that the up and down play of the piston ring in its groove in their engine should be about $\frac{5}{1000}$in. Anything greater than this would be called a bad fit. This clearance, of course, is not so important as that between the end of the rings, which they recommend should not be allowed to exceed $\frac{1}{64}$in.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

A Baffling Trouble.

I have a two-stroke which exhausts a shower bath of petrol from the air intake at low speed. It seems all right when opened out. The petrol level is correct. Is there anything I can do to remedy this?—J.B.

Although you think your petrol level is correct, this would be the first thing we should examine for an explanation of your trouble. The level should be about ⅛in. from the top of the jet. If reducing the level to this height does not cure the trouble, a probable explanation is faulty piston rings. It is possible, but hardly probable, that incomplete closing of the throttle may have something to do with the trouble if the symptoms occur when the throttle is nominally closed. The trouble is, however, one in which it is extremely difficult to give satisfactory advice without the opportunity of examining the machine.

READER'S REPLY.

Questions re an Old Engine.

Regarding the part of "W.M.'s" query in your issue of September 5th, which refers to Minerva spares. I think if "W.M." corresponds with the following firm he may get what he requires: The Ellenborough Engineering Works, Ellenborough Road, Lordship Lane, Wood Green, N.—H.J.M. (Portsmouth).

INCOMPLETE ADDRESS.

If "A.O.L." (Birmingham) cares to send us his full name and address, and to comply with our rule *re* a stamped addressed envelope, we will try to help him.

RECOMMENDED ROUTES.

WEST BROMWICH TO BORTH.—E.C.H.

West Bromwich, Dudley, Bridgnorth, Ludlow, Knighton, New Radnor, Penybont, Rhayader, Llangurig, Ponterwyd, Bow Street, Borth.

MANCHESTER TO MIDDLESBROUGH.—J.W.McC.

Manchester, Oldham, Huddersfield, Leeds, Harrogate, Ripley, Ripon, Thirsk, Tontine Inn, Stokesley, Middlesbrough.

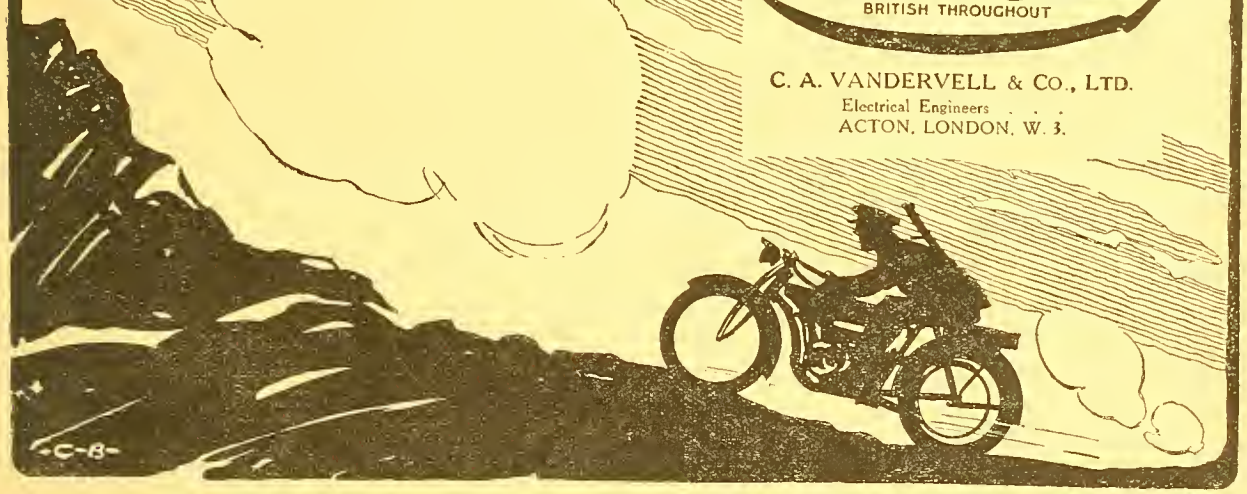
Efficiency

even under the most strenuous war conditions is GUARANTEED— if you fit your bike with the ALL-BRITISH

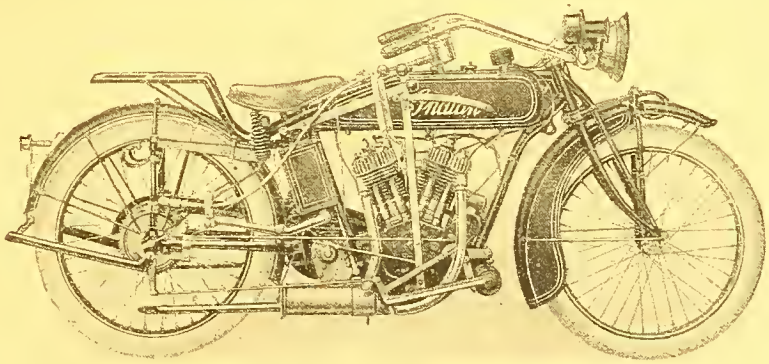
A.V. Magneto

BRITISH THROUGHOUT

C. A. VANDERVELL & CO., LTD.
Electrical Engineers
ACTON, LONDON, W. 3.



We regret that we are not in a position to supply motor cycles at the present time. But we can send a 1918 descriptive list on application. *This applies to Great Britain only.*



"Indian Motocycle" Hendee Manufacturing Co.

HENDEE MANUFACTURING Co.,
"Indian House," 366-368, Euston Rd., London, N.W.
Telephone: Museum 1643.
Telegrams: "Hendian, Eusroad, London."
AUSTRALIA—109-113, Russell St., Melbourne.
CANADIAN WORKS—12 11. Mercer St., Toronto.
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 579, West St., Durban; Indian House, Strand St., Port Elizabeth

1918 Indian Powerplus

Electrically Equipped.

In answering these advertisements it is desirable to mention "The Motor Cycle."

A39

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

2¾h.p. A.J.S., 3-speed, fully equipped, like new; £46/10.—15, Rustic Av., Streatham, S.W.16. [7642

1915 A.J.S. 6h.p. Combination, with spare wheel, etc., in fine order.—Cross, Jeweller, Rotherham. [X7995

A.J.S. 6h.p. Combination, little used, grand condition, very smart turn-out, spare wheel, and all accessories; £80.—4, Bentcliffe Lane, Leeds. [X8000

6h.p. A.J.S. 1915 Combination, dynamo lighting set, de luxe sidecar, special good engine, doctor's orders not to ride; 90 gns.—Seen at Wauchopes', 9, Shoe Lane, London. [8136

1918 A.J.S. 6h.p. War Model, and Mills-Fulford sidecar, accumulator electric lighting set, horn, condition perfect; £108.—Robinson, 48, Armitage Rd., Milnsbridge, Huddersfield. [X8015

A.J.S., 2¾h.p., 3-speed countershaft, excellent condition, speedometer, lamp, etc., £42; 2-speed ditto, £35; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7811

A.J.S., 2¾h.p. 1916 model, despatched works Nov., 1915, 3-speed, clutch, kick starter, quick detachable wheels, enclosed drive, fully equipped, splendid mechanical condition; £40.—239, Walsall Rd., Darlaston, S. Staffs. [8194

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MORGAN, 1916, G.P., J.A.P., discs, heliotrope	£130
MORGAN, 1917, G.P., J.A.P., as new, dark green	£135
SWIFT, 1914, 7-9 h.p., lamps, being re-painted	£130
HUMBERETTE, 1914, 8 h.p., air-cooled	£72

SIDECAR COMBINATIONS.

HARLEY-DAVIDSON, 1917, aluminium, sport s/car	£128
HARLEY-DAVIDSON, 1917, sporting sidecar	£125
HARLEY-DAVIDSON, 1915, 1917 improvements	£60
HARLEY-DAVIDSON 1916 Combination, electric	£76
ENFIELD 1915 6 h.p. Combination, spring handlebars	£70
ENFIELD 1914 6 h.p. Combination, 2-seater Sidecar	£60
ENFIELD 1916 8 h.p., 2-seater Sidecar	£82
MATCHLESS, 1918, 8 h.p., War Model, new	£125
MATCHLESS, 1917 8 h.p. M.A.G. model, hardly used	£164
MATCHLESS 1918 war model, £10 of accessories	£120
MATCHLESS, 1917, 8 h.p. M.A.G., Lucas dynamo	£150
SUNBEAM, 1914, 3½ h.p., all accessories	£64
HUMBER, 1917, 8 h.p., flat twin, water-cooled	£84
INDIAN, 1915, 7-9 h.p., requires slight repairs	£55

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RUDGE, 3½ h.p, special Isle of Man Model	£40
ENFIELD, 1912, 2¾ h.p., 2-speed, chain drive	£21
RUDGE, 1912, 3½ h.p., fixed gear, picked engine	£20
LEVIS, 1917, shop-soiled, 2-speed, 2-stroke	£46
DOUGLAS, 1914, 2¾ h.p., 2-speed very fast	—
P. & M., 1914, 3½ h.p., 2-speed, kick-start	£48
DOUGLAS, 1913 (late), 2¾ h.p., 2-speed	£34
DOUGLAS, 1914, 2¾ h.p. 2-speed, nice order	£36
DOUGLAS, 1914, 2¾ h.p., 2-speed, just overhauled	£38
DOUGLAS, 1915, 2¾ h.p., 2-speed, as new	£45
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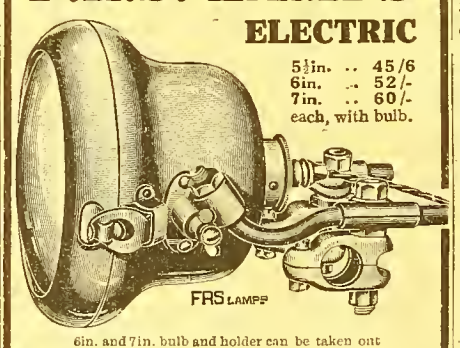

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A.J.S.

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4987

Alldays.

2½h.p. Alldays Matchless, 2-stroke, new 1915, splendid condition; £20.—G. G. Mimmack, Moulton Chapel, Spalding. [8071

Ariel.

1915 Ariel Combination, 6h.p., new condition; £70. —86, High Rd., Lee, S.E. [8166

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

Bat.

1914 Bat Combination, 6h.p., 3-speed; bargain, £50. —86, High Rd., Lee. [8164

1914 6h.p. Bat, C.B. sidecar, wind screen, overhauled, plated, and enamelled, little used last 2 years.—Peasgood, 29, Linwell Rd., Stamford. [X7861

BAT-J.A.P., 1913, 8h.p., canoelet sidecar, Albion 2-speed, handle starter, 3 lamps, good condition; £35.—Davis, 1, Wellington Buildings, Bow, London, E. [8193

Brough.

BROUGH, 3½h.p., 1916, 3-speed countershaft, kick-starter, speedometer, horn; £60; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [7899

B.S.A.

1916 B.S.A., 4½h.p., perfect order; £58.—86, High Rd., Lee. [8165

B.S.A., new Model H, chain drive, actually in stock, no permit required.—Moss, Wem. [X7976

1915 B.S.A. and Millford Sidecar, complete, lamps, etc.—Cross, Effingham Sq., Rotherham. [X7996

B.S.A., 1915, 3-speed countershaft; £45.—Surgeon Henry, Royal Naval Hospital, Larbert, N.B. [8077

B.S.A., 1916, K, Millford sidecar, speedometer, etc., good condition; £58.—Shackleton, Monton. [8118

B.S.A. 1915 4½h.p. Countershaft Combination, all-chain, 3 lamps, spare chains, valve; 38 gns.—13, Windsor Rd., Teddington. [8159

1917 B.S.A. 4½h.p. Combination (C.B.), Klaxon horn, Stewart speedometer, good condition; £68/10.—27, St. John's Rd., Putney. [8228

B.S.A. and Sidecar, 1914-15 machine, countershaft 3-speed gear box, clutch, kick start; sacrifice £38.—The Laurels, 1, Gunnersbury Lane, Acton. [8212

1916½ B.S.A. 4½h.p. Coachbuilt Combination, lamps and speedometer, splendid condition; 65 gns.—Hulbert, 160, Askew Rd., Shepherd's Bush. [8094

B.S.A. 1917 4½h.p. Combination, fitted with handsome B.S.A. coachbuilt sidecar, complete with best accessories; £75.—Wauchopes', 9, Shoe Lane, London. [8139

4¼h.p. B.S.A. 1916 Combination, chain drive (equal to new), only been on the road ten times; £70.—Full particulars, Bentley, 86, Gateford Rd., Worksop, Notts. [X7959

B.S.A. 4½h.p. Late 1916 Combination, chain-cum-belt drive, 3-speed countershaft, Millers head lamp, generator, rear lamp, lamp to sidecar, full kit of tools, all tyres as new, whole outfit as new, only having done very small mileage, Mills-Fulford sidecar; bargain, £75.—Mebes and Mebes, 154-6, Gt. Portland St., W.1. Tel.: 3426 Mayfair. [7989

Buccleuch.

BUCCLEUCH, 2-stroke, 2¾h.p., 3-speed and clutch, Stuart engine, T.B. mag., not done 200 miles; £30.—Barlow, 77, Buccleuch St., Kettering. [X7957

Calthorpe.

CALTHORPE-J.A.P., 1915, 2¾h.p., 2-speed, perfect, little used; £28.—73, Godwin Rd., Forest Gate, E7. [8097

CALTHORPE-J.A.P., 1916, used only 3 months, Enfield gear, lamps, etc.; £27.—Bruce Wood, Horn Park Farm, Lee, S.E. [8115

CALTHORPE-J.A.P., 1916, 2¼h.p., 2-speed, clutch, lamps, horn, spare tube, belt, as new; £22/10.—84, Strode Rd., Willesden, N.W. [8154

CALTHORPE Junior, 2-speed, free, 4-stroke, lamps, little used; sell £19, or exchange 2¾h.p. Douglas, 1913; offers.—238, Hawthorne Rd., Bootle. [X7965

CALTHORPE-J.A.P., 2¾h.p., 1916 model, 2-speed Enfield gear, sloping tank, accessories included; £27/10.—Wauchope's, 9, Shoe Lane, London. [8119

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

CALTHORPE-J.A.P., 2½h.p., 2-speed, clutch, Lucas horn, almost new condition, 30 gns.; Calthorpe Junior, 2-speed, horn, and rear lamp, as new, 20 gns; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7813

MOTOR CYCLES FOR SALE.

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1915 Calthorpe-Jap, 2¾h.p., nearly new, fitted two good Moseley covers; first offer secures.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

FOR Sale, 2¼h.p. 1917 Calthorpe motor cycle, 2-speed, just thoroughly overhauled, and in new condition throughout; £28, or nearest; giving up motoring.—Mr. A. Hawkins, 150, Main Rd., Glascote, near Tamworth, Warwickshire. [8231

Campion.

1916 Campion-Jap, 2¾h.p., 2-speed, absolutely reliable; £24.—86, High Rd., Lee. [8168

CAMPION Ambulance Outfit, complete in every detail, brand new, in stock, ready to drive away; £125.—Embro Motor Co., 21, Charlotte St., Hull. [8117

CAMPION-J.A.P., 4h.p., 2-speed countershaft clutch, hand start, all chain, Lucas horn, excellent condition, £38/10; with sidecar, £42; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7812

Chase.

CHASE-J.A.P., 1916, 2-speed Jardine gear box, streamline sidecar, new tyres, lamps, horn, speedometer, large exhaust pipes, perfect condition, will do 60, property R.A.F. officer; any trial; £50.—Bruce Wood, Horn Park Farm, Lee. [8114

Chater-Lea.

1915 7-9h.p. Chater-Lea Combination; genuine bargain, £55.—86, High Rd., Lee. [8167

Chater-Lea-Jap.

CHATER-LEA 1914 Combination, 4h.p. J.A.P. engine, Mabon gear, free engine, kick starter, coach-built sidecar, lamp set, everything in new condition; £36, lowest.—Edward, 58, Malvern Rd., Dalston. [8190

Clyno.

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London. [X7814

1914 5-6h.p. Clyno Combination, 3-speed, interchangeable wheels, also one spare wheel, tyre and tube, 2 lamps, 2 generators, horn, condition good, mechanically sound; any examination; £59/10; wanted, Henderson and Harley, or exchange, cash adjustment.—Pirie, Cranleigh. [8146

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; E.P. or exchange.—Service Co., 292, High Holborn, London. [7910

Coventry Eagle.

COVENTRY Eagle, 1915, 2¾h.p., 2-stroke, Bosch mag., Senspray carburetter, Brampton spring forks, T.T. bars, lamps, horn, tyres, excellent condition, like new; £22.—Drummer Sparkes, 12, Ingrove St., Battersea, S.W.2. [8092

Douglas.

1915 Douglas (special model), 2¾h.p., 2-speed; £42.—86, High Rd., Lee. [8169

DOUGLAS.—Prompt delivery to those on work of National importance.—Gibb, Gloucester. [4749

DOUGLAS, 1912-13, 2¾h.p., 2-speed.—Ticeburst, 1 Cannah's Grove, Old Trafford, Manchester. [X7958

DOUGLAS, 1914, 2¾h.p., 2 speeds, in very good condition; £35.—Bell, Old Post Office, Nenthead, Carlisle. [8068

1915 4h.p. Douglas and Sidecar (coachbuilt), 3-speed, kick starter, lamps, horn, etc.; 58 gns.—Gibb, Gloucester. [8206

DOUGLAS, 1915, Colonial model, 3-speed, perfect condition; first cash £45 secures.—26, George St., Hove, Sussex. [8107

DOUGLAS; prompt delivery to farmers, doctors, and others doing work of National importance.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS, 1914, 2-speed, complete with lamps and horn; £35; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [7905

DOUGLAS, 2¾h.p., 1914, 2 speeds, clutch, kick starter, very good condition; £30; no bargaining.—7, Meath Rd., Ilford. [8192

DOUGLAS, 1913, 1914, and 1915 models, in stock. See displayed advertisement page.—Maudes', 100, Gt. Portland St., London, W.1. [8236

DOUGLAS, 2¾h.p., 1915, clutch model, 2-speed, speedometer, lamps, horn, good condition; £35.—Box L7,153, c/o *The Motor Cycle*. [8223

DOUGLASES, Indian, 7-9h.p. Clyno, Humbers, Rex combinations, dozens various to clear.—Parish's Motor Exchange, Preston. Stamps reply. [X7858

DOUGLAS Motor Cycles.—We can supply by return 1918 models on receipt of permit.—Eli Clark, the Douglas agent, 196, Cheltenham Rd., Bristol. [0923

1914 Douglas 2-speed, fitted with light coachbuilt sidecar, warning signal, etc.; £37/10 complete combination.—Wauchope's, 9, Shoe Lane, London. [8120

4h.p. Douglas Combination, 70 bore, 2-speed, clutch, kick start, Lucas horn, mirror, Rushmore lamp set; 50 gns.; can be seen and tried any time by appointment.—"The Laurels," Theydon Park Rd., Theydon-Bois. [8110

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ABSOLUTELY NEW 1915 7 h.p. Spring Frame WAR MODEL INDIAN Motor Cycles, fitted with 2-speed gear boxes and all accessories.

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2¾h.p. Douglas, 1915, 3-speed clutch, kick start, perfect order, tyres good, all accessories; seen Dartford; best offer over £50.—Box 2,265, c/o *The Motor Cycle*. [X7914

FOR Sale, 1912 2¾h.p. Douglas motor bike, condition as new, perfect running order, or would exchange with cash adjustment for Morgan or A.C. Sociable.—Deakin, Fovant Camp, Wilts. [8104

NEW Douglas Motor Bicycles.—The latest 2¾h.p. models for instant delivery for those engaged on work of National importance against permits. How and where to obtain them, fullest particulars and prices, apply to Robinson's Garage, Green St., Cambridge. [7993

4h.p. Douglas, spring frame, special solo, 2-speed, kick starter model, Rolls-Royce motion, fine condition, small mileage, purchased 1915, unused since, original Dunlops (2¾in.), new condition; inspection, trial invited; reasonable offers considered.—Motorist, Mount field, Prestwich. [X7990

1918 4h.p. Douglas Combination, chain drive, one-lever carburetter, interchangeable wheels, the latest in every respect, with special coach sidecar, hood, screen, and spring wheel, 3 lamp sets, Cowey speedometer, horn, in perfect condition, driven a few miles only for demonstration purposes.—Prices and particulars, Robinson's Garage, Green St., Cambridge. [7995

Elswick.

ELSWICK, 1914, 3½h.p., Armstrong 3-speed gear, clutch, Bosch mag., lamps, horn, spares, etc., new tyres, perfect, very fast, stored since 1914, only done 2,700 miles; a gift, £40, or nearest offer.—Higham, Lovely Hall, Wilpshire, Blackburn. [X7950

Enfield.

1916 Enfield Combination, 6h.p., lamps, horn, nice condition; £70.—Below.

1917 Enfield Combination, 6h.p., lamps, horn, speedometer, very good order throughout; £90.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

1917 3h.p. Enfield, lamps, horn, all complete, new condition; £48.—Glenn, Garage, Uppingham. [X7938

ENFIELD Combination, new electric lighting set, new Smith's speedometer, £45; also Premier, 3½h.p., £18/10.—69, Kingston Rd., New Malden. [8156

1917 3h.p. Enfield, lamps, horn, all complete, new condition; £48, or part exchange for late higher power machine.—Glenn, Garage, Uppingham. [X7953

ENFIELD, 1914, 6h.p., 2-seater sidecar, £60; 1915 6h.p. combination, £70; 1916 8h.p. combination, 2-seater sidecar, £82.—Maudes', 100, Gt. Portland St., London, W.1. [8237

LATE 1916 6h.p. Enfield Combination, hood, wind screen, electric lighting, speedometer, Klaxon, all as new, little used; accept 79 gns.—Box L7,151, c/o *The Motor Cycle*. [8218

1917 Enfield Combination, storm apron and all accessories, 90 gns.; 1916 model, £85; 1913 model, £45; also a 1915-16 dynamo lighting combination, £95.—Wauchope's, 9, Shoe Lane, London. [8121

F.N.

4-CYL. F.N., bought 1914, ridden 500 miles, new condition; £25, bargain.—125, Willow Av., Edgbaston, Birmingham [X7621

Givaudan.

6h.p. Givaudan, perfect condition; £18.—Winn, 81, Bolingbroke Rd., Coventry. [X8016

Grandex.

2h.p. Grandex; £22/10.—Wauchope's, 9, Shoe Lane, London. [8122

Harley-Davidson.

1917 Harley-Davidson and sporting torpedo sidecar, lamps, horn, very sporting outfit; £110.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

1915 Harley-Davidson, 3-speed, kick start, hand and foot clutch, Bosch mag., unused since 1916, property of officer, in magnificent condition throughout; any trial; £55.—6, Abbotsford Rd., Redland, Bristol. [X7862

HARLEY-DAVIDSON 1917 3-speed Combination, sporting aluminium sidecar, electric model, all accessories, £128; ditto, Swan sidecar, £125; 1916 electric combination, £76; 1915 solo model, with 1917 finish, £60.—Maudes', 100, Gt. Portland St., London, W.1. [8238

Henderson.

HENDERSON, 10h.p., 4-cyl. model, 2 speeds, excellent condition, coachbuilt sidecar, all accessories, including speedometer; £90.—Maudes', 100, Gt. Portland St., London, W.1. [8239

HENDERSON, 10h.p., 4-cyl., 1915 model, complete with sidecar, lamps, etc., a splendid combination; £87/10; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [7903

Humber.

HUMBER, new 3½h.p. flat twin model, actually in stock; no permit required.—Moss, Wem. [X7977

HUMBER, 1917, 8h.p., water-cooled, flat twin, all accessories, very small mileage; £84.—Maudes', 100, Gt. Portland St., London, W.1. [8240

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Humber.

1917 6h.p. Flat Twin 3-speed Humber Combination, lamps, horn, speedometer, spare tyre and tubes, etc.; bargain, £80.—25, Newsome Rd., Huddersfield. [X7856

Indian.

INDIAN, 1914 model, 2 speeds, spring frame, very powerful and fast; £35.—Wauchope's, 9, Shoe Lane, London. [8123

INDIAN, 1915, 7-9h.p., 3 speeds, kick start, requires overhauling, £15 worth of spares for this purpose; £55.—Maudes', 100, Gt. Portland St., W.1. [8233

INDIAN 1916 Powerplus Combination, spring frame, dynamo, wind screen, luggage carrier, in splendid condition, all spares; £90.—26, Hargrave Park, Highgate, N. [7927

INDIAN. 1915, 7-9h.p., clutch model, re-enamelled, overhauled, not ridden since; seen any time; £36, no offers, a great bargain.—32, Mornington Rd., London, N.W. [X7956

7-9h.p. Indian, 1916, very little used, in perfect condition, fast and powerful machine, sidecar fitted with hood and screen, etc.; complete £90.—Hillcoat, Grand Hotel, Dover. [7450

1916 Powerplus Indian, 3-speed, foot and hand clutch, lamps, tools, just overhauled, perfect condition, very fast; part exchange Morgan.—Lieut. Blackburne, Imperial, St. Annes-on-Sea. [X7952

INDIAN Combination, 5-6h.p., automatic carburetter, spring frame, condition as new, sidecar well sprung, with wind screen, lamps and horn, foot clutch, Brooks saddle; price 65 gns.; E.P. or exchange.—The Service Co., 292, High Holborn, London. [X7815

Invicta.

1917 Invicta, 3½h.p. King Dick engine, Sturmey-Archer countershaft 3-speed gear, Stewart horn, speedometer, lamps, and spares. Henderson lightweight sidecar, condition as new, not done 400 miles; £80, or offer.—226, Attercliffe Common, Sheffield. [8083

Ivy.

IVY, 4-5h.p. twin J.A.P., coach combination, 3-speed, Bosch, Senspray, Stewart speedometer, lamps, etc., all in good condition; £40, or exchange with cash for powerful chain combination.—Denton, 75, Burnley Rd., Colne. [X7966

Ixion.

1914 Ixion 2¾h.p. 2-stroke; bargain, £15.—86, High Rd., Lee, S.E. [8170

James.

JAMES Combination, 1913, 3-speed gear, coachbuilt sidecar, £47/10; also a 1914 James combination, £57/10.—Wauchope's, 9, Shoe Lane, London. [8124

J.E.S.

J.E.S. 1¼h.p. Motor Bicyclette, first-class condition, very little used, 3-speed gear, 180 m.p.g.; £17.—Ghar-id-dud, Belmont, near Sutton, Surrey. [X7992

Juno.

1915 Juno, 2¾h.p., 2-speed, genuine bargain, £22.—86, High Rd., Lee, S.E. [8172

Kerry

1914 Kerry-Abingdon Combination, 3½h.p., 3-speed, very fast, £40.—86, High Rd, Lee. [8173

Levis.

1915 Levis, 2-speed, 2¼h.p., £24; also one single gear, popular model, £22.—86, High Rd., Lee. [8174

LEVIS, new 2½b.p. 2-speed model, actually in stock; no permit required.—Moss, Wem. [X7978

LEVIS, 1915 model, 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

LEVIS, 1917 model, new machine, slightly shop-soiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St, Ledbury. [X7263

Martin.

MARTIN, 2¾h.p., racer, very sporting; 26 gns.—Particulars from L. Bullard, Hazelwell, Cheltenham. (Wanted, reliable F.N.) [X7973

Matchless.

MATCHLESS and Sidecar, new, spare wheel; £120.—Turpin's, 29, Preston Rd., Brighton. [8158

WE Can Give Immediate Delivery from stock of the W.O. Matchless combination, complete with spare wheel; £125.—Below.

1914 Matchless Combination, 8h.p. M.A.G., good condition; £65.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

1918 Matchless Combination, super model, mag. engine, hood and screen, spare wheel; £130.—Ross, 86, High Rd., Lee. [8186

MATCHLESS, 1913 J.A.P. 8h.p., 2-speed, C.B. sidecar, nice condition; £35, or exchange lower power; offers.—16, Carlyle Rd., Manor Park. [8229

MATCHLESS Combination, 1918, brand new, 7-9h.p. M.A.G. model, standard grey colour, last one to be had, all Lucas accessories, complete, hood and screen, spare wheel, etc.; accept £160.—Short, 485, Upper Richmond Rd., East Sheen. [8073

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2. **ALLON,** 1916, 2-speed, 2-stroke ..... **29 gns.**
3. **BRADBURY,** 1914, 4 h.p., 2-speed, clutch, re-enamelled ..... **35 gns.**
4. **BRADBURY,** 1914, 4 h.p., 3-speed coachbuilt Combination ..... **35 gns.**
5. **B.S.A.,** 1913, 3½ h.p., 2-speed, clutch, re-enamelled ..... **31 gns.**
6. **CALTHORPE-J.A.P.,** 1916, 2-speed, clutch, 2¾ h.p. ..... **29 gns.**
7. **CALTHORPE-J.A.P.,** 1915, 2-speed clutch, 2¾ h.p. ..... **24 gns.**
8. **CALTHORPE,** 1916, 2-speed, 2-stroke . **23 gns.**
9. **COVENTRY EAGLE,** 1916, 2-speed, 2-stroke, re-enamelled ..... **29 gns.**
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13. **DOUGLAS,** 1913, 2-speed ..... **27 gns.**
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16. **HARLEY-DAVIDSON,** 7-9 h.p., 3-speed, dynamo lighting, mileage 400 .... **67 gns**
17. **HUMBER,** new 3½ h.p. flat twin 1918, 3-speed ..... **75 gns.**
18. **HUMBER,** 1913, 3½ h.p., 2-speed, coachbuilt Sidecar ..... **29 gns.**
19. **INDIAN,** 1915, 7-9 h.p. T.T., clutch, road racer ..... **39 gns.**
20. **INDIAN,** 1914, 7-9 h.p., T.T., clutch .. **29 gns.**
21. **INDIAN,** 1914, 7-9 h.p. 2-speed ..... **35 gns.**
22. **N.U.T.-J.A.P.,** 1915, 3½ h.p., twin, 3-sp., sporting canoelet ..... **51 gns.**
23. **N.U.T.-J.A.P.,** 1915, 3½ h.p., twin, o.h.v. single speed ..... **35 gns.**
24. **N.U.T.-J.A.P,** 1915, 3½ h.p., twin, 3-speed, T.T. ..... **43 gns.**
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29. **PREMIER,** 1915, 2¾ h.p., clutch, as new **24 gns.**
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34. **SCOTT,** 1914, 3¾ h.p. 2-speed, **33 gns.**; with Sidecar ..... **39 gns.**
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38. **SINGER,** 1914, single cylinder re-enamelled ..... **27 gns**
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41. **TRIUMPH,** 1914, 4 h.p., T.T., clutch **29 gns.**
42. **TRIUMPH,** 1913 3½ h.p., clutch ..... **24 gns.**
43. **TRIUMPH,** 1911, 3½ h.p., 2-speed ... **17 gns.**
44. **TRIUMPH,** 1911, 3½ h.p., standard .. **14 gns.**
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MATCHLESS, 1918, war model, coach sidecar, interchangeable wheels, 3 electric lights, horn, etc., as new; £127.—Bruce Wood, Horn Park Farm, Lee, S.E.12. [8112

MATCHLESS War Model Combination, with spare wheel and tyre; £125; trade enquiry entertained; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [X7986

MATCHLESS.—Early deliveries of 8h.p. J.A.P. war model combination, spare wheel; £125; exchange arranged. Now booking post-war deliveries.—Maudes', 100, Gt. Portland St., London, W.1. [7737

MATCHLESS 8h.p. War Model Combination, many extras, like new, £120; 1917 combination, practically new, M.A.G. engine, Lucas dynamo lighting, sprung wheel sidecar, £150; another 1917, without dynamo.—Maudes', 100, Gt. Portland St., London, W.1. [8234

MATCHLESS 1914 Combination, 8h.p. J.A.P. engine, £75; practically new combination, complete with hood, screen, spare wheel, Palmer tyres, speedometer, lamps, horn, etc., M.A.G. engine, £125; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [X7816

Minerva.

MINERVA, 2¼h.p., mag., B. and B., just overhauled, good order; £8; seen appointment.—15, Wickham Rd., S.E.4. [X7994

Monopole.

MONOPOLE, 1917, 2¾h.p. Villiers engine, 2-speed, countershaft, clutch, lightweight torpedo sidecar, head light, mechanical horn, whole as new; £42; consider older combination part.—134, Cherry Orchard Rd., Croydon. [8189

Motosacoche.

1916 Motosacoche, 2-speed Enfield gear, nice order; £34.—86, High Rd., Lee. [8175

BEST War Bargain of the week.—3½h.p. twin Motosacoche, special engine, very fast and powerful hill-climber, all chain drive, Enfield 2-speed gear, footboards, mudshields, 4 spare chains, etc., 2 carburetters; rock-bottom, £24, for quick sale.—Millard, Eiger House, Chesterfield. [X7935

New Hudson.

3½h.p. 1914 New Hudson, 3-speed model, fitted with 2 coachbuilt sidecar and accessories; £35 the combination.—Wauchope's, 9, Shoe Lane, London. [8125

1914 Big Six New Hudson Combination, in good mechanical working order, with new tyres.—J. Stafford, Sons and Oswin, Campbell St., Leicester. [8088

NEW Hudson Coachbuilt Combination, 1914 turnout, 3-speed, clutch, kick start, beautiful turnout, complete speedometer, lamps, etc.; great bargain, £35.—The Laurels, 1, Gunnersbury Lane, Acton. [8211

New Imperial.

1915 Imperial-Jap, 2-speed, nice condition; £26.—86, High Rd., Lee, S.E. [8171

CROW Bros., Guildford.—New Imperial, all models, new and second-hand, in stock. [5371

2¾h.p. New Imperial-Jap, 1916, 2-speed clutch and kick-starter, 40 gns.; also another, same specifications, £35.—Wauchope's, 9, Shoe Lane, London. [8126

NEW Imperial Motor Cycles.—2-speed, standard, and lady's models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

NEW Imperial, 1916, 2¾h.p. J.A.P., 2 speeds, free engine, not run 1,000 miles, used summer months, spare horn, cover, tools, enamel and tyres like new, guaranteed perfect; good reasons for selling; price £36.—W. Hunt, 25, Regent St., Barnsley. [X7790

Norton.

1915 Norton Combination, 4h.p., countershaft chain drive, lovely condition; £68.—Ross, 86, High Rd., Lee, S.E. [8176

T.T. Norton, 1915 model, £40; also another, same make, 1916 model, offers.—Wauchopes', 9, Shoe Lane, London. [8127

NORTON, 3½h.p., 1915, countershaft 3-speed, chain-cum-belt model, Binks carburetter, all lamps, horn, and tools, in perfect condition throughout, private owner; price £52.—N. Walker, 17, George St., Hull. [8069

N.U.T.

N.U.T., 1915 T.T., 4h.p. twin J.A.P., 3 speeds, kick start, speedometer, new Druids, Mark II., Canoelet Minor, many spares, fast and reliable; £40, no offers, bargain; photo sent.—Lieut. H. Steed, 4th Northern Hospital, Lincoln. [X8010

O.K.

O.K.—There will be no better lightweight obtainable. Book now for early delivery.—Youngs, The Parade, Kilburn, N.W.6. [7238

WAUCHOPE'S, 9, Shoe Lane, London, have two O.K.'s for sale, single-speed model £20, 2-speed model £27/10.—Wauchope's, 9, Shoe Lane, London. [8128

Omega.

1914 Omega, 2-speed, low position; £22.—Ross, 86, High Rd., Lee. [8177

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

We don't want it now.

IN a few unthinking and only partially informed quarters, the attitude of the motor press to the fuel question has been unfavourably criticised. If we asked for relaxations of the fuel restrictions in certain cases we were unpatriotic, because the fuel was not to be had without endangering national prospects. If we adopted the attitude, which is the only one tenable in general at the present time, that fuel was not to be had, and that asking for more was simply wasted breath, or ink and paper, we were neglecting the interests of the motoring community. Needless to say, if we had to lay ourselves open to one of these two charges, we should prefer the latter, under present conditions. On the other hand, this is no reason why we should not concentrate our attention and constantly call that of others to the post-war prospects in the fuel world.

The importance of motor fuel is a matter that needs no elaboration from us at this stage. Our railways are admittedly badly and inefficiently organised and managed. We have considerable areas of timber that have never been exploited because of the lack of adequate transport facilities. Transport is indeed the basis of present-day civilisation, and fuel is the basis of transport. The development of various kinds of fuel is rather interesting. The earliest equivalent of fuel was liquid—*i.e.*, water—which provided power in the form of water-wheels for all our first mills and factories. Water was replaced by coal, with the consequent shifting of the centres of industries. Coal, in its turn, is now being, to a large extent, replaced by oil, which will mean not so much the re-shifting of centres of industry, as an increase in them, because the distribution of oil is much less limited in its scope than that of coal. In time oil may give way to electricity, which will probably involve a reversion to water power and central power stations, but those days are not yet.

The importance of fuel is being recognised; of that there can be no doubt. Only last week the newspapers had a little burst on the subject of Lord Cowdray's activities in the Chesterfield district. For a long time we had been expecting steps to be taken in this direction, and rumours had been prevalent; but now for the first time definite action has been taken towards the discovery of oil in the British Isles.

In a recent issue we mentioned in "Current Chat" the discovery of large shale deposits in the Bristol district, which were so rich with oil that the shale would burn brilliantly on the application of an ordinary match flame; yet in spite of our serious situation as regards fuel, these deposits are unexploited. Fuel is the keynote of progress, and many people think, with good reason, that the fuel that will provide our first salvation will be a benzene fuel, *i.e.*, benzole. In our issues of July 11th and 18th we dealt with the future of benzole, and in the latter issue we suggested that the procuring of a guaranteed market would be a very valuable step towards the solution of future fuel difficulties. In our issue of August 8th we replied to some ridiculous criticisms that had been levelled against our previous suggestion, showing how flippantly those most concerned are inclined to regard the whole situation. It is indeed the old story of never crossing a bridge until you come to it—an attitude most excellently illustrated in the article contained in this issue on the Luxury Tax.

Apparently the motoring organisations and private motorists have not yet realised what they are up against in the fuel sphere, and are not prepared to take any definite action. There are rumours afloat that the motoring organisations are going to move, but rumours are of little use, and what we want is definite statements and definite action.

Next to the private motorist and the motoring organisations, those most concerned in the fuel question are the manufacturers. Perhaps it would be more correct to say that the manufacturers

An index to the advertisements in this issue will be found on the page facing the back cover

We don't want it now.—

are more concerned than anyone, because the scarcity and high price of fuel will militate far more against the future prosperity of the motor trade than will any such measure as a Luxury Tax. Thus manufacturers should take up the attitude which we previously recommended to the motoring organisations. Through their well-organised trade associations or unions they are in a position to approach the benzole producers with sound, well-reasoned, business propositions. There should be no need to tell them what lines those propositions should take. These are self-evident.

Perhaps it would be as well to add a word of warning as to the relative importance of such a fuel as benzole in the motor world. In 1905 our consumption of petrol was fifteen million gallons; in 1914 it was 124 million gallons. In 1914 a considerable amount of benzole and other substitutes were on the market, to the total of something like ten million gallons. Presumably this was all that was available. In other words, the whole of the benzole available in 1914 would not have satisfied the motor market in 1905. Is it likely to satisfy it after the war? Certainly not, unless the production of benzole is enormously increased, and nothing is less likely than this, unless the producers are given some sound business inducement to increase their production. Hence it is now up to the manufacturers to save themselves, their trade, and the future of motoring as a whole by the exercise of careful foresight.

Countryside Advertising Disfigurement.

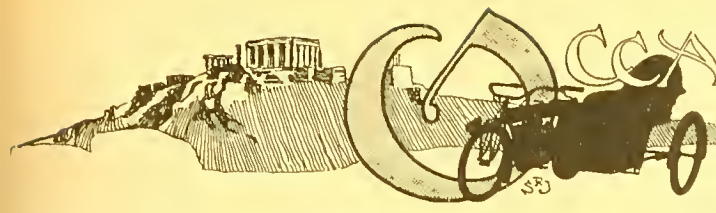
SOME time back the question of reviving the effort to remove objectionable advertisement hoardings and the like from places of natural beauty and the countryside generally was raised in committee of the Royal Automobile Club, and information was sought from the Society for Checking the Abuses of Public Advertising (S.C.A.P.A. Society) as to how far that body had been successful in the prosecution.

By byelaws framed under the Advertisements Regulation Act of 1907 local authorities can forbid field boards and roadside display, as well, probably, as the more blatant signs on business and other premises (outside urban limits), and the Home Office has shown itself ready to confirm such byelaws when there is clear evidence of local desire for relief.

An eight-page pamphlet has now been prepared by the R.A.C., in collaboration with the S.C.A.P.A. Society, dealing with the facts of the case, and it is proposed to place this pamphlet in the hands of all local authorities who have not as yet taken action. The Act allows five years' grace to advertisements which are in existence at the time the byelaws are framed. This may seem discouraging, but, properly considered, it should operate as an incentive to local authorities to take action at once.

It may appear to some that the present is an unsuitable time for propaganda unassociated with war work, but it is submitted that, on the contrary, never was time more suitable than now for this particular work. It is common knowledge that, owing to restrictions upon the use of metal, wood, paper, and printing, the maintenance of field and roadside advertising boards has been made impossible. They have been thereby reduced to a minimum by the natural processes of the weather, and if, on top of this, further enactment by byelaw removed after a space of five years what remained of them, the least possible harm would be inflicted upon the owners.

Two Morgans near the Devil's Elbow, Isle of Man. A photograph taken long ago.



OCCASIONAL COMMENTS

BY 'IXION'

Steel Roads.

MR. LLOYD GEORGE is not a Kitchener. He revs. rather freely when he begins to talk. As a Bishop once wittily remarked in the House of Lords, Mr. George "suffers from a Celtic susceptibility to environment, which makes him inflammatory at Limehouse and conciliatory in the House of Commons." When he unthrottled the remark to which I shall presently refer, the Welsh wizard was addressing a Manchester audience—*i.e.*, an assembly of ex-motorists, subconsciously disgruntled by (*a*) the petrol restrictions, and (*b*) the petrified melons which compose hideous caricatures of roads in the Lancashire cotton area. These facts being as cited, what are we to make of Mr. George's statement that after the war we are to have "hundreds of miles of steel road"? Was he thinking of trams or of railways? Was he merely uttering a post-prandial personal prophecy? Or was he revealing an official plan of the reconstruction policy? Will Mr. Joynson-Hicks or some other legislator who is moderately sane on transport problems please get the Premier to commit himself more definitely on the matter?

Rubber Substitutes—Good-bye-ee!

IF these steel roads actually materialise the asylums will fill up fast. Every country is full of paupers afflicted by oversize brains and dreams of perfecting an invention which everybody will have to buy. Amongst the King Charles's heads obsessing these ill-balanced craniums the invention of a cheap, perfect, and unpuncturable tyre has long held pride of place (excepting, of course, perpetual motion). The Hun has failed to invent a rubber substitute under the spur of war, which proverbially gingers up ideas: in his rubber famine he has shod his M.T. wheels with rope, blocks of wood, and loose steel treads floating creakily on coiled springs. Mr. Lloyd George goes straight to the heart of the problem, "A perfect tyre is unthinkable? Very well. Wash out the notion. Let's have a perfect road. Then any old tyre will do." Quite simple. Probably quite sound, too.

The Coming Wheel.

I DARESAY the idea is partly fathered by the dual necessity of repairing the world's war-shattered roads in a manner suited to the fast, heavy traffic of the new horseless era, and of absorbing a steel output which has increased multifold during the war. Anyhow, the prospect is pleasing. No mud. No punctures. No pot-holes. We shall presumably develop motor cycles with rather deep-flanged wheel rims, in which a solid rubber tyre will be firmly gripped. It will require a corrugated tread, as rubber will skid on wet steel. My one grief is that, as long as the steel roads are nice and new and smooth, the spring frame will retire into the background, *pro tem.* But perhaps the Premier was only "gassing" after all.

Stopping Induction Pipe Air Leaks.

ONE of our commonest pre-war troubles took the form of air leakage into the induction pipes of twin-cylinder engines. Rigid one-piece induction manifolds, manufactured with no particular severity in respect of limit gauges, were bolted up to two or more cylinders, which in turn were located by inaccessible holding-down nuts of small size. Even if the joints were originally made with real accuracy (a doubtful supposition), the least carelessness in erection by an amateur mechanic ensured an air leak. Alternatively, the pipe was occasionally equipped with a gland of sorts, but such glands were seldom airtight in the hands of a slipshod amateur. The nett result was that the induction pipes of multi-cylinder machines usually leaked. If an owner tightened up each union a turn at a time in rotation he got leaks evenly distributed between all the cylinders; and, unless the leaks were of large area, no great harm was done, especially if his carburetter was set on the rich side, as is the rule of the trade. But happy-go-lucky owners often tighten one union right home and then commence operations on the other, in which case they get an airtight joint at one cylinder and a weeping leak at the other. Ever afterwards the rider starts the engine up on one cylinder, and goes precariously down the street with the engine going pippety-pop-pop, and a "will-that-other-cylinder-ever-chip-in" expression on the rider's face. Usual remedy—twenty yards of insulating tape.

Aero Engine Induction Joints.

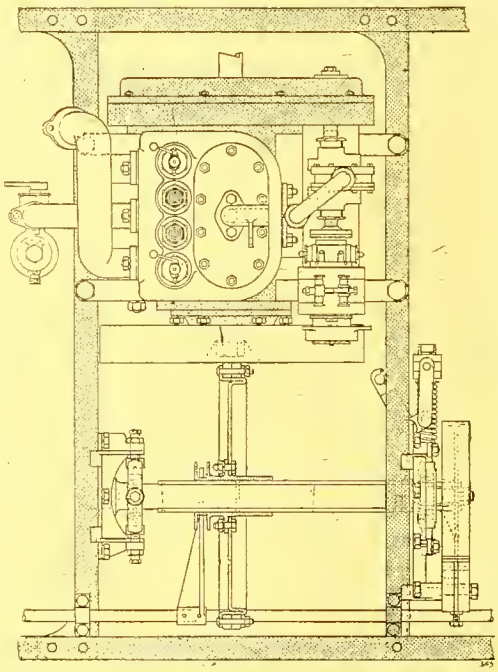
AIR leaks at induction joints are the bugbear of aerodrome engine squads. It is never too easy to coax perfect slow running out of a 400 h.p. hot-stuff engine. Yet it has to be done. You cannot accelerate a huge engine with heavily-stressed big end bearings until its lubrication system is warm: and such an oiling system may involve several parasangs of oilways and up to ten gallons of oil. If the carburetter fitter does not get perfectly slow running, the pilot or engine a.m. gets fed up with waiting for the oil to heat, as the engine vibrates and spits and stops. Then the engine is opened up prematurely, and a bearing goes, and a strafe begins. So air leaks at the induction joints of aero engines expand to the dimensions of a crime in the R.A.F.: consequently, within reasonable limits, they simply do not happen. The joint surfaces are made and kept dead true. Absolute cleanliness is insisted upon. The surfaces are anointed with a suitable jointing compound, and new washers are fitted every time the joints are broken. Over and above these precautions, the engine is built to fine limits, so that tolerably precise registering of the parts in every direction is attained: and further, if the design is at all complex, an adjustable airtight gland may be embodied in the induction pipe branches.

THE FRICTION-DRIVEN MOTOR CYCLE.

A Simple Form of Transmission offering Possibilities in Motor Cycles.

THE gear that is the ideal of engineer and rider alike is one that is infinitely variable. To obtain this, automobile engineers have for long racked their brains, and several very ingenious designs have been produced, including hydraulic transmissions, for which extravagant claims have been made. However, the only infinitely variable gears in use in motor cycle engineering are those embodying expanding and contracting pulleys used with V belts, of which the Zenith-Gradua and Rudge-Multi are the best-known types.

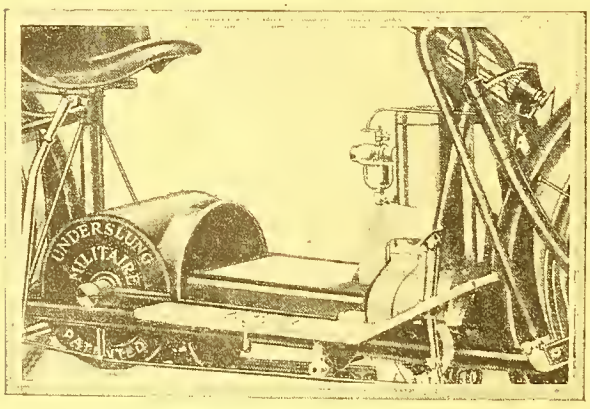
In the car field, the pulley with movable flanges is not a success. Even with comparatively light cycle cars the principle had very serious faults, which, incidentally, were more responsible for the demise of the cycle car than any other part. Nevertheless, the car engineer has at his disposal an infinitely variable gear in the friction drive, and, while the majority of cars equipped with this transmission system have proved a failure, the record and popularity of the G.W.K. light car goes to prove that, properly applied, the friction system is capable of being made a success.



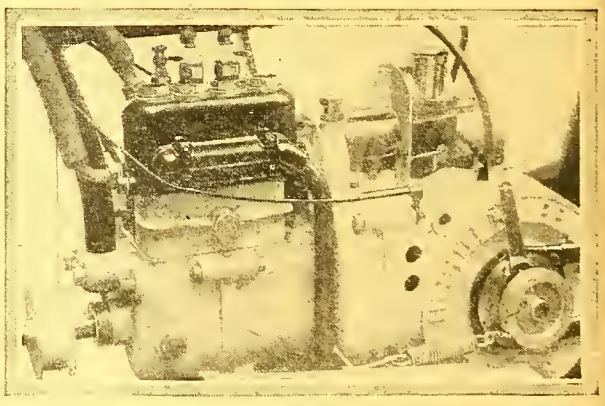
The engine and friction "gear" unit of the G.W.K. light car, a vehicle that by its efficiency has removed many of the prejudices concerning friction drive.

As is perhaps almost generally known, the most conventional automobile friction system consists of a disc driven by the engine (sometimes the flywheel of the engine is used for this purpose) and a wheel having a fibre periphery. The latter is carried on a shaft the line of which is at right angles to the engine-shaft, and, usually, it is splined to allow the friction wheel to be moved laterally, but at the same time to drive the shaft at any position the wheel may be. The centre of the disc face is hollowed, so that when the friction wheel is in the central position it is not in contact. This is the "neutral" position. The driven shaft is also movable at one end, so that the wheel and disc may be separated and so act as a clutch, inasmuch that the power is withdrawn from the road wheels at will.

For the benefit of the novice who does not understand how the different gear ratios are obtained, it is perhaps necessary to explain that, starting from the "neutral" position where the wheel is at the centre of the disc, it will be seen that if the fibre wheel moved a little along the face of the disc it will be in contact with the latter at a point, say, 2in. from its centre. Supposing both disc and wheel to be 12in. diameter, this will approximate to two gear wheels in mesh: one—the driver—being 4in. diameter (2in. from the centre is the radius, hence 4in. will be the diameter of the circle described at this point); and the other—the driven wheel—12in. diameter. This provides a gear ratio of 3 to 1. If the second reduction in the transmission, as in the back axle of a car, be 4 to 1, then the total gear reduction in this position would be 12 to 1. If the driven wheel is moved a little further—say another inch—it would then be in contact with the driving disc at the point where it is 3in. from the centre or 6in. diameter. This makes a friction gear reduction of 2 to 1 and the total reduction 8 to 1. A little consideration will show that the further from the centre of the driver the driven wheel



The engine and friction set of the single-cylinder American Militaire.



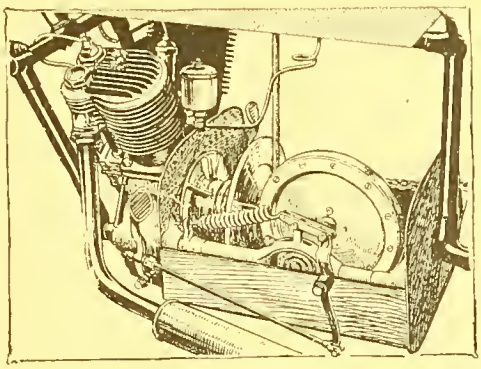
The engine and friction gear unit of the Herdtlé-Bruneau motor cycle

The Friction-driven Motor Cycle.—

is in contact, the nearer will be their respective speeds, until the 12in. driven wheel was in contact at a point describing a circle 12in. in diameter, when the ratio would be 1—1. If the disc be larger than this, and the driven wheel is moved beyond the point where the ratio is 1 to 1, then the ratio is no longer a reduction, because the driven shaft is caused to revolve at a higher speed than the driver. In automobile practice, however, it is not usual to use the friction set to gear up, and the driver and driven members are the same size, or rather the working face of the driver is no larger than the diameter of the driven wheel.

Reference to the diagram (previous page) which illustrates the G.W.K. system, will show its simplicity, and one is constrained to ask why such a system has not become popular on motor cycles.

Probably the popular prejudice against friction transmissions may have been responsible for no large firms experimenting in this direction. Experiments have been made and at least four machines have been made, two of which were marketed. These are the early Militaire, produced in America, and the Herdtlé Bruneau, a French design. Both these machines are illustrated on the previous page. The other two machines referred to are the Shacklock and the Ridgway. The former was an inventor's model only, the patent specification of which appeared in these pages in February, 1915; but the latter was of a principle embodying several wheels and discs.



The power and friction unit of an English friction-driven motor cycle—the Shacklock.

Friction transmissions are used very extensively in the United States on ton lorries, heavy tractors, and large pleasure cars, on which they are reported to be in every way satisfactory. Certain it is, however, that if they were not satisfactory their life on the market would not exceed one season, and several of these propositions have appeared year after year. Hence it may be assumed that the friction transmission has reached a stage beyond that of experimentation. This is confirmed by the fact that after several years' experience with their friction-driven light car, the G.W.K. concern are announcing a post-war model, which will be a large four-seated car.

As friction transmission has been proved satisfactory for heavy tractors and other vehicles all very much heavier than a motor cycle, and since, theoretically, the frictional contact is practically the same in all cases, there would appear to be no doubt that it would be even more efficient on a motor cycle. On cars the friction disc and wheel are about 12in. in diameter In the heavier vehicles they rarely exceed 15in.; therefore one may assume that a wheel and disc 10in. in diameter would be ample on a motor cycle. Even if 12in. were found more satisfactory the motor cycle could accommodate them; in fact, there seems to be no reason why the friction-driven motor cycle should not be a huge success.

In any case, the friction system offers very certain inducements for the designers of a type of motor cycle which is bound to come along eventually, *i.e.*, the Ford type of machine, produced and sold at a moderate figure; but, in addition to the low cost of production, there are very certain advantages in its silence, cleanliness, and wide range of gear ratios.

VEDETTE.

"HAND" BRAKES.

ONLY few machines are equipped with brakes fitted with ratchet gear to hold the brake as the "hand" brake of a car. This is a point well worth the attention of designers, who should remember that motor cycles are now used extensively (or were before the war) in extremely hilly districts where kerbstones are few and where the chances of transmission breakages are greater. Any motor cyclist who has had his chain or belt break on a steep hill will understand the necessity for a fitment such as we suggest. Not only are the majority of brakes very ineffective in holding a machine from running backwards, but the driver is unable to leave the saddle until a stone has been placed against the rear tyre or he has backed his machine into the bank, which, incidentally, is a more difficult operation than it appears.

UNSATISFACTORY MOTOR TUITION.

A FATAL motor cycle collision during the testing of a girl candidate for the Royal Air Force was recently the subject of an enquiry by the Coroner at Surbiton.

The candidate said she was driving a motor cycle with sidecar, in which was a sergeant-major, who was testing her. The motor cycle swerved to the off side, and the sidecar struck the deceased's bicycle. Replying to the Coroner as to nervousness and losing control of the machine, witness said she had undergone a course of two and a half hours' instruction at a school of motoring.

The sergeant-major said it was not the Army practice to ask for a certificate of proficiency when women presented themselves for enrolment They tested the applicants themselves. He had tested a good many pupils from the school of motoring mentioned, and had never found one right yet. A verdict of "Accidental death" was returned.

In the interests of motoring, the Automobile Association will give advice as to the selection of schools at Fanum House, Whitcomb Street, London, W.C.2, and also at its branch offices. When students have cause to be dissatisfied with the tuition received, the Association will consider the facts, and if necessary take strong action for the protection of the public.

THE MOTOR MARKET IN AUSTRALASIA.

WE have received some information regarding motoring in Australia and New Zealand which will be of particular interest not only to our readers at home, but also to the various manufacturers who, after the war, are hoping to export their products to the southern hemisphere.

Naturally, the most important item in any country where there is any possibility of motoring is road surface, and our informant—Mr. James Thornell, of Sydney, New South Wales—gives us some very useful information on this point.

Road Surfaces.

So far as the principal cities are concerned, the centres of these are paved with wood. Further out, asphalt or macadam is used, while the suburban portions have their roads constructed of well-rolled blue metal and sand. Occasionally a layer of tarmac is laid on the top of the partially-rolled metal.

As most of our readers are aware, it is between the main centres that the roads are at their worst. According to Mr. Thornell, the country roads are nondescript. Sometimes a mile or so of asphalt is laid on top of the partially rolled-in metal, which, after a certain amount of traffic has passed over it, reveals hollows and bumps which make a sort of switchback. Parts of the roads are often loose sand, loose stones, or loose natural earth, occasionally intersected by waterways, through which one has to drive. These latter are more particularly to be found in New Zealand, as the early settlers in that colony went in more for irrigation than those in Australia.

In summer time the roads between the main centres are sandy and dusty, while during the rainy season they become so cut-up by traffic that ruts six to eight inches deep are found. The mud is so bad that the driving wheels of cars often refuse to grip.

So far as gradients are concerned, in places the hills are very steep, sometimes even worse than the Kirkstone Pass, and this, combined with the loose metal on the road, makes the going very difficult. Level crossings are frequent, and occasionally the rails are raised above the level of the road. Sometimes—and only sometimes—streams are bridged.

The standard wheel track of carts is 4ft. 8in., and these create ruts in the road that distance apart; consequently motor vehicles should be built with the same width of track so as to run comfortably in the ruts.

A high crank case clearance is most essential, 10in. or 12in. clearance being necessary at times for vehicles with more than two wheels.

Mr. Thornell's information emphasises the importance of spring frames. He has had some experience of our roads after they have been worn by war-time traffic, and states that if one multiplies a broken road in England by three, some idea will be arrived at of what the average colonial road is like.

Regulations affecting Motoring.

Rules and regulations affecting motoring vary according to the different States, and a separate licence has to be taken out for each State.

A licence is necessary for the driver, and in some States a road tax per wheel is imposed. Motor cyclists keep to the left in Australia and New Zealand.

Type of Motor Cycle required.

Mr. Thornell has given us a very careful specification of the type of machine which he considers would be most suitable for colonial roads.

The Australasian model should be fitted with a 6-8 h.p. twin-cylinder V or other type engine. The frame should be composed of 1⅛in. × 14 gauge tubes for the top bar tube, the tube under the tank, and the back bar tubes. The rear fork tubes should be 1in. × 14 gauge, the back stay tubes ⅞in. × 14 gauge, and the down tube should be reinforced, as 10 gauge tubing is not sufficiently strong. A really efficient spring frame is a *sine quâ non*. The wheels should have 28in. × 3in. standard S.M.M.T. rims, and the ground clearance should be from 6in. to 7in. at least. A three-speed gear box and kick-starter should be supplied, and the gear wheels should be always in mesh. Mudguards should be 4½in. to 5in. in width, and when fitted should have at least 2in. clearance from the inflated tyre.

Brakes and Sidecars.

As regards brakes, one of these should be of the internal expanding pattern on the hub. If chain transmission is fitted, there should be some type of engine shock absorber to take off the harshness of the drive. Mr. Thornell prefers the American type of spring fork, and declares this to be the most efficient.

As regards sidecars: complete sidecars built up are practically barred from entering Australia, owing to the duty, which is £10, or 25% *ad valorem*, per sidecar, whether wholly or partially built up. The sidecar chassis must therefore go in unassembled, when it is, in the main, duty free. Sidecar bodies are built in Australia.

New Zealand, on the other hand, admits the complete sidecar, owing to the small duty, which is 10%. There are a few firms importing component parts of

Overseas Section.—

motor cycles from England and assembling them in Australia, but there are none in New Zealand. American motor cycles are suitable for colonial conditions, both as regards construction and price, and they practically enjoy a monopoly at the present time.

American Enterprise.

Mr. Thornell is most emphatic as to the line which should be taken by firms endeavouring to introduce their goods into Australia, New Zealand, or Tasmania. He considers that the American system should be followed, since America has made such strides in those parts since the war started.

In the ordinary way it would be outside the scope of *The Motor Cycle* to deal with this subject, which is really more suitable for a trade journal, but the exceptional circumstances prevailing, and the fact that our Overseas readers have experienced great difficulties in obtaining British motor cycles at reasonable prices in the past, give us sufficient excuse, we think, for publishing our informant's views on this matter.

American manufacturers send out factory representatives with full powers and instructions to lay down such schemes of working which, after due consideration, are found to be most suitable. Samples of their machines are supplied to each main centre and demonstrated so that the representative can interest the most suitable and energetic agent for each particular territory. The American representative always insists upon agents contracting for a large number of machines, and, further, with regard to American methods, Mr. Thornell states, "By this you will gather the value of the 'man on the spot' having a direct interest in the business of manufacture."

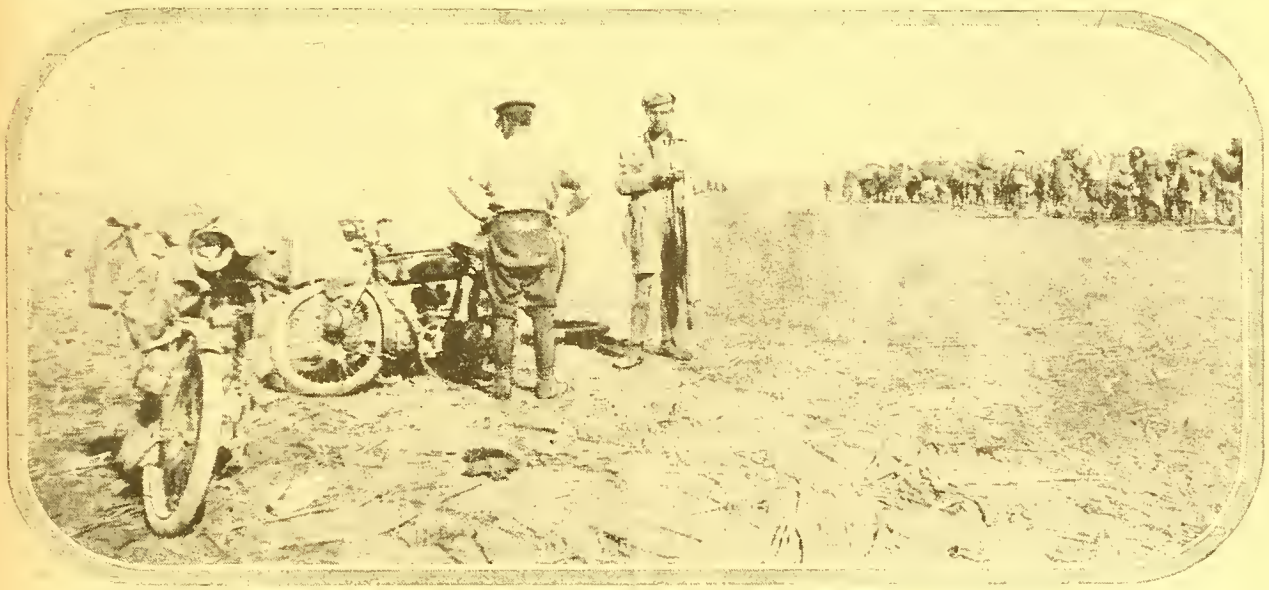
After taking into consideration all the details, the American representative would fix a definite cost for the machine, which would enable the agents to make a reasonable profit, and yet the price would not be inflated to the eventual purchaser. On the other hand, owing to the out-of-date methods of the British manufacturers, the Australian and New Zealand purchasers of British-made machines have, as a general rule, had to pay inordinately high prices.

Dealing with the question of the motor cycle business in Australasia, Mr. Thornell writes: "So far as motor cycles are concerned, the Americans were not great on these markets before the war, but since the war they have come along in a surprising fashion; not only have their sales largely increased, but their machines are suitable to the Colonial conditions. As a matter of fact, traders right the way through Australia and New Zealand have informed the writer that, whatever their feelings might be towards British trade, unless our manufacturers alter their methods and their models the business must go to America, and this, you will agree, will be most regrettable."

The Shipping of Motor Cycles.

Mr. Thornell gives some interesting information as regards shipping motor cycles to the Overseas Dominions. These, he says, should be packed carefully and enclosed in cases of wood 1in. thick, and the machines should be bolted and padded so that they cannot come adrift. Motor cycles should have all projecting features removed, such as handle-bars, the idea being to pack in a compact fashion and save all possible space. All parts likely to suffer from damp should be well covered with vaseline. The New Zealand Customs duty requires motor cycles to be practically dismantled before packing.

Mr. Thornell's concluding remarks should be taken to heart by British motor cycle makers: "It is a source of surprise to me that our manufacturers have not combined together in sending out a man on whom they could place every reliance—a man with a clean organised brain, who would be able to collect first-hand information, and who would not allow his mind to be biassed by outside influences. The expense of such an undertaking would be amply repaid by the information gathered." (This is, of course, an idea reminiscent of Sir Charles Mandleberg's scheme, with which we have already dealt.)



A REPAIR IN THE EGYPTIAN DESERT. Despatch riders busy with an inner tube whilst the column moves forward

THREE NEW SPRING FORK DESIGNS.

More Evidence that the Springing Problem is receiving Attention.

In our issue for July 18th, 1918, we added eight designs of spring frames to the large number already reviewed in these pages, bringing the total up to 124 since the last Olympia Show. Five weeks later we illustrated four sidecar springing devices. In the issue for August 8th we gave a long article on spring fork design by a Dutch engineer, and we are now able to give particulars of three new spring fork patents.

THE first design of the trio under review is the subject of a patent granted to Messrs. Brampton Bros., Ltd., and although intended primarily as an improvement to the well-known Brampton fork the device may be applied to any suitable kind of spring fork, the object of the invention being to absorb more effectively minor shocks. A duplex system of springing is provided, in which a light spring, or springs, is first compressed or put in tension, after which the main spring comes into play and absorbs the main shock or load, minor shocks and light loads being taken by the light spring. The illustration, fig. 1, renders a lengthy description unnecessary. It will be seen that in operation in either direction the lighter spring at the end effected will be fully compressed before the main spring comes into action. Both light road shocks and reaction shocks are absorbed by the lighter springs.

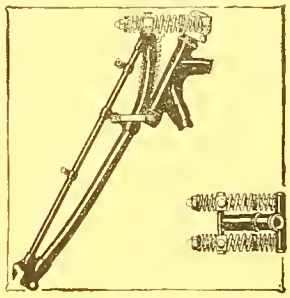


Fig. 1.—The Brampton patent. No. 116,335, June, 1918.

A Precision Patent.

Patented by Messrs. F. E. Baker and F. J. Biggs of the Precision works, fig. 2 is interesting as showing that well-known motor cycle engineers are willing to depart from the orthodox in design when justification is promised. Our illustration shows four alternative designs applying the principles of the invention. It will be seen that laminated springs are used, the fork being pivoted at the crown. (A previous Precision patent laminated spring design was described in our issue of November 22nd, 1917.) The illustrations are so clear that description is unnecessary. In passing, however, it occurs to us such long laminated springs would be rather heavy, while any spring fork which in action varies the wheelbase is far from ideal if only on account of the undue wear of the front wheel tyre. This does not apply only to the invention illustrated but to many spring forks.

The third design in fig. 3 is the patent of Mr. W. H. Osborne, of Birmingham, and, as will be seen, like the Precision patent, it embodies a laminated spring. In this device, however, the fork is of the link type. In one form the steering column is provided with a rearwardly extending arm carrying at its lower extremity the rear end of the spring, which is adapted to extend forward at a slightly oblique angle above the mudguard and within the blades and girders of the fork. The lower links are shown as connected to the bar between the blades and girders. Alternatively, the lower links may be coupled to a member adapted to slide backwards and forwards in relation to the fork proper, or the spring may be anchored to the fork and may project rearwards to its extremity, which is of scroll form, this extremity being coupled to the steering column. It is claimed that this device, having a double action, utilises the same spring to absorb the vibrations or concussions in both actions of the fork.

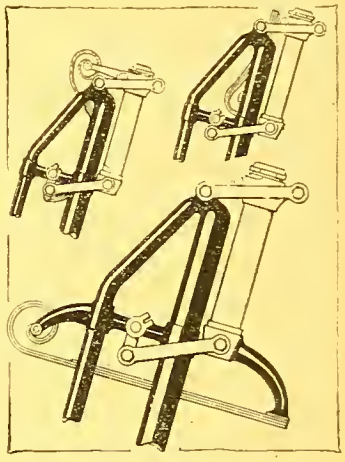


Fig. 3.—The Osborne device. No. 116,528, June, 1918.

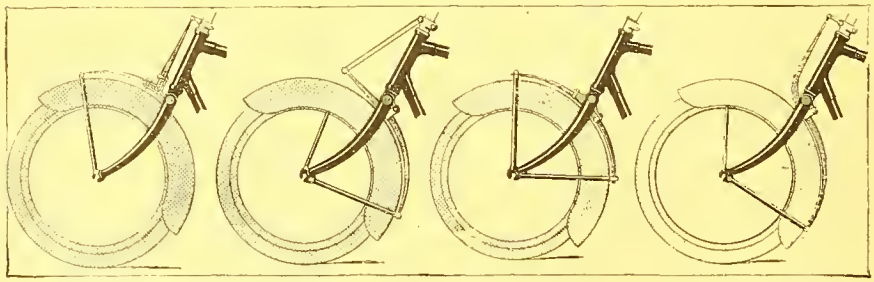


Fig. 2.—Four alternative designs by F. E. Baker and F. J. Biggs. No. 116,234, June, 1918

POST-WAR POLICY OF THE SHELL COMPANY.

THE post-war policy of the Shell Co., as outlined in the recent speech of the chairman (Sir Marcus Samuel), comprises an extensive programme for the provision of oil supply depots throughout the world. Other matters of interest are also mentioned in the following condensed report of the address:

"We hold in Government War Loans and in Treasury Bills about £20,000,000, which enables us to deal confidently in the provision of facilities which are necessary for the expansion of the business. The first of these is the establishment of oiling stations throughout the entire world.

"A new German ship-building company has been formed, with great financial backing, to construct ships run by oil motors. The Shell Co. has endeavoured to bring home to British builders the significance of the internal-combustion-engined ship, and the Germans, already awake to the importance of the motor, have learned a great deal more about it during the war. Proposals to create a large fleet of standard ships driven by steam engines are afloat, but I feel sure they cannot compete with ships driven by internal combustion engines, which are being manufactured on a gigantic scale by the Germans, the Americans, the Danes, the Dutch, and the Swedes. The Shell Co. is determined to provide oil stations wherever they are required, feeling quite confident that the future will develop more and more the need for oil. Placed as our fields are throughout the world, we are in a better position to furnish these requirements than any other company. We have received information of oil in Tarakan that had not been struck before, which will very materially add to our supplies of liquid fuel at a spot where they are most vital to the well-being of the world. The well gave an initial production of 1,200 tons a day.

"Lest it should be thought in calling attention to the internal combustion engine we are urging our own selfish interests, I must tell you that from our commercial point of view, it is infinitely better that vessels should burn oil rather than use it in internal combustion engines."

DON'T FEEL SORRY FOR A DISABLED MAN—EMPLOY HIM.

1854 1918

From the Days of the Crimea

SOME EPISODES IN

B.S.A. HISTORY.

B.S.A. AND THE GREAT WAR.

HAVING from their earliest days been associated with the production of munitions of war, the B.S.A. factories occupied a position of National importance, and with the outbreak of the present war became of inestimable value to the Allied Armies. Besides being the home of the Lewis Machine Gun and B.S.A. Rifles, many other important products for military use are made in the B.S.A. Works, including B.S.A. Bicycles and B.S.A. Motor Bicycles. On all the Fronts B.S.A. Machines are earning the highest praise for their reliability and long service. Whether in war or in peace, B.S.A. Bicycles and Motor Bicycles consistently maintain the same high quality of material and workmanship for which the B.S.A. name has always been famous.

Despatch rider with B.S.A. Motor Bicycle in Ypres.

THE BIRMINGHAM SMALL ARMS COMPANY LIMITED,
BIRMINGHAM.

The Fables of Fame

A lonely tourist, wearying of the lack of companionship on his travels, decided to attach a sidecar to his motor cycle. All went well for a while, but soon difficulties arose. His machine failed where it had never failed before; hills became terrors to him and his companion. Finally, he decided he must again tour alone or purchase a car. The former being contrary to his ideas of enjoyment and the latter beyond his means, he abandoned motoring, his health and his pleasure suffering in like degree The

CLYNO

THE Sidecar Motor Cycle

would have solved his perplexities and to-day—but for the war of course—he would have been revelling in the delights such an outfit would afford him, for the Clyno is specially built for the combination of Motor Cycle and Sidecar, it is a complete unit—the only one of its kind—that is why those who intend to tour the country in that companionable, sociable, easy going and economical manner—by way of Motor Cycle and Sidecar—should unhesitatingly decide on a Clyno outfit for their Post-war motoring pleasures.

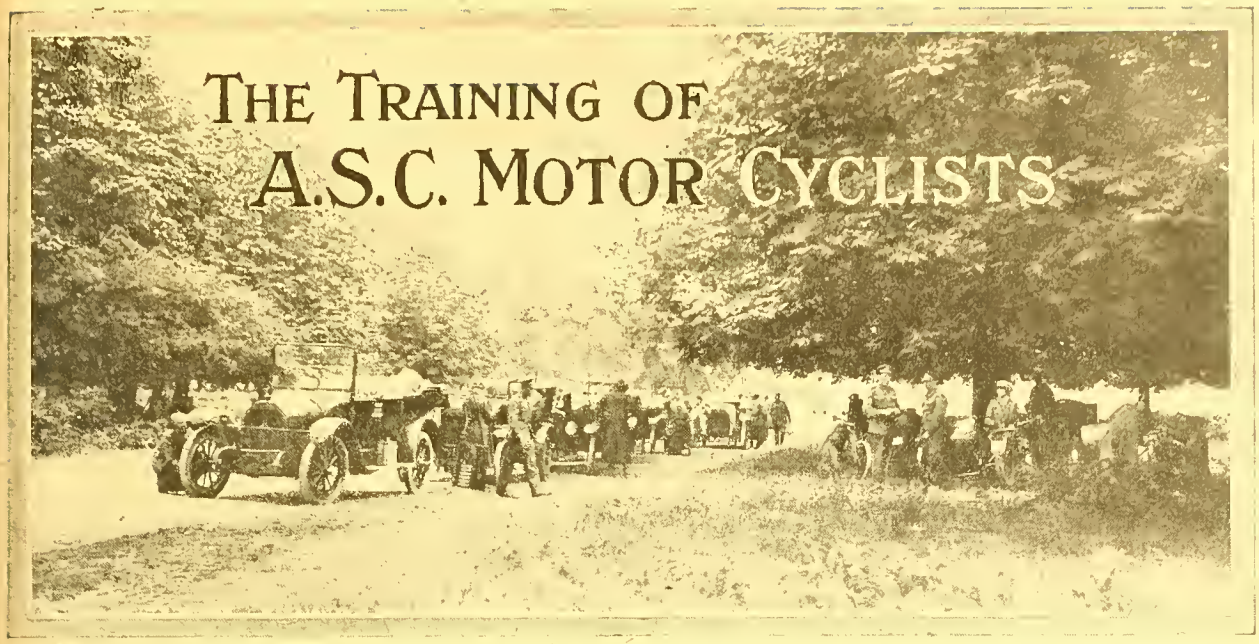
Here's the Clyno Post-war Policy.

Mass Production of One Model (8 h.p.)
Competitive Prices of both Outfit and Spares
And Strictly Rotational After-war Deliveries

THE CLYNO ENGINEERING CO.,
Pelham St., WOLVERHAMPTON.

In answering this advertisement it is desirable to mention "The Motor Cycle."

THE TRAINING OF A.S.C. MOTOR CYCLISTS



IT is not generally known that near the Metropolis there is a huge Army school in which motoring is taught in the most thorough manner. The Army Service Corps Motor Transport Section employs a certain number of motor cyclists, both men and women, the latter being recruited from the ranks of the Women's Legion, 15, Pall Mall East, London, W.1., and some notes concerning their training will be of undoubted interest. The school is wonderfully well equipped, and lectures on lorries, cars, and motor bicycles are given by eloquent N.C.O.'s, who lucidly describe the various parts of the motor vehicles upon which they are lecturing by means of a magic lantern and a cinema, the slides and films for which are developed by the school's own photographic staff.

The school extends over a considerable area, and the various hutments and lecture rooms are interspersed with intervals of thoroughly cultivated ground, so that the depot is practically self-supporting so far as vegetables are concerned.

A squad of women learners about to start on an instructional trip.

Besides the school there is a headquarters, a large garage, in which there are thirty-eight solo machines used by officers for supervisional work, and sidecar outfits for Women Legion instructors. The instruction is, of course, much simpler in the case of the motor cycle than in the case of a car, but it is none the less thorough, and very often the women drivers have to take up the driving of not only a motor cycle but of a Ford car as well.

The girls are taught by the same staff and in the same manner as the men, but at different times, and are quartered in a neighbouring area.

The girls are often sent all day on convoy work, and in the morning a pupil may be driving a Ford car and in the afternoon a motor cycle.

Those who are under instruction have to pass through four classes. If they have had considerable experience before joining the school their progress is naturally very rapid, while if they are found to be slow in learning they are given special instruction, and if this does not suffice they may be drafted on to other work. As soon as they have passed out of Class A they have to undergo a special test carefully conducted by a separate staff.

The school is well equipped with models, and those who pass through it have gained a valuable knowledge of motor bicycles which would take years to obtain in the ordinary way. Special note is taken of speed in driving, and the pupils have impressed upon them the necessity of driving at a moderate rate, and cases of fast driving are severely dealt with. The length of the course is thirty days, but this will be extended to forty in the near future.

Times to Light Lamps.

SUMMER TIME.

Sept. 26th	... ...	7.20 p.m.
,, 28th	... ...	7.16 ,,

GREENWICH TIME.

Sept. 30th	... ...	6.11 p.m.
Oct. 2nd	... ...	6.6 ,,

Motoring in Australia.

There is a likelihood of pleasure motoring being restricted in Australia in the near future, in order to save petrol.

A Cleveland Auto-wheel.

The latest auto-wheel is an American. The makers of the Cleveland lightweight have embodied an engine similar to their two-stroke, with shaft and worm drive, in a new type of auto-wheel.

The Illegal Use of Petrol.

Sir Hercules Langrishe, R.N.V.R., was recently fined £2 by the Isle of Wight Bench for using his motor cycle without a permit, despite the fact that at the time he was on Government duty as King's Messenger.

Makers and Buyers.

The capital in the motor cycle industry is an investment for which the dividends depend upon the buying public. Makers should remember this, and try to keep the goodwill of motor cyclists at the present time.

Decoration for "Chinook."

Mr. H. Mortimer Batten ("Chinook"), late of the editorial staff of *The Motor Cycle*, and now driving a sidecar ambulance in the Vosges, has been awarded the Croix de Guerre "for courage and devotion to duty under perilous and arduous conditions."

Heartiest congratulations, and best wishes for speedy recovery from an attack of *la grippe* which overtook him on the day of the decoration.

The German Motor Press.

So far the German motor journals do not show any signs of the pinch of war. We have one before us, *Motor*, which in lavishness of get-up, and (it must be admitted) in artistic excellence, need fear no comparison. Doubtless, this is part of the Hun propaganda. There is one particularly delightful advertisement of the "Lufttorpedo," of Berlin, which shows a fleet of Gothas returning *insouciantly* from London, from which tortured city great lurid flames a thousand feet high leap up. The Tower of London is positively incandescent! Still, it is not only the imagination that requires to be fed.

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One Way of Getting Petrol.

A correspondent vouches for the truth of the following: "A friend, who is an eloquent conversationalist," he writes, "interviewed an important official at the P.C.D. *re* a grant of petrol for a friend. The result of the interview was a blank application form on which was written by the official 'This application is to be granted —— (signed) X.Y.Z.'

"The applicant thus now has a blank application form that he may fill in for any amount of petrol, comfortable in the assurance that it will be granted."

The Raleigh Horizontal Twin.

When a member of our staff saw Mr. Harold Bowden, of the Raleigh Cycle Co., last week, he was pleased to hear that the future is very bright for prospective owners of Raleigh motor cycles. The firm intend to devote a considerable portion of their energies to exploiting the machine described in *The Motor Cycle* of May 30th as soon as conditions permit of manufacture in quantities. Those who have owned Raleighs and Raleighettes may remember that there was no more highly finished motor cycle on the market than these machines. British makers of high-class motor cycles will have a worthy competitor in the Raleigh Cycle Co. in, we hope, the near future.

Castor Oil.

Many of our readers still think that castor oil is a suitable lubricant for motor cycle engines, for the simple reason that it is employed on aeroplane motors. It will be seen, however, from the following remarks, culled from the *Revue des Produits Chimiques*, that this lubricant is by no means ideal even for aeroplane engines:

"Castor oil has so far been the best lubricant for aero engines, owing to its high viscosity even at high temperatures, its high flash point, and low freezing point. A further point is the increased efficiency of the engine owing to the decomposition of castor oil tending to form *glycerine and fatty acids, which, attacking the metal*, form metallic soaps, and make a tight joint between piston and cylinder. This, *however, gives rise to wear in time*. The author has experimented with stable mineral oils possessing the advantages, but not the disadvantages, of castor oil. It is hoped to get oils a little less dense than castor oil, with a comparable fluidity and flash point. The freezing point of such oils would be appreciably higher."

The italics are ours, and it is interesting to note that the author has succeeded in improving upon this lubricant.

Special Features.

THE FRICTION-DRIVEN MOTOR CYCLE.
HERE AND THERE WITH THE LUXURY TAX.
ALCOHOL CARBIDE FUEL.

A Harley Flat Twin?

According to the American Patent files, the Harley-Davidson concern is interested in flat twins, and has recently filed a patent in this connection.

Petroil Lubrication.

It has been suggested to us that half the failures of the petroil system were due to improper oil being used. In this direction, as in all methods of lubrication, once more we reiterate, only the best oil is good enough.

From Planes to Motor Cycles.

We hear that a leading aviation works will, after the war, market a first-class motor bicycle with the most modern features. The design of the machine and the plans for its production and distribution have already been settled.

Reversion to Greenwich Time on Monday next.

The Home Secretary gives notice that summer time will cease and normal time will be restored at 3 a.m. (summer time) in the morning of Monday next, September 30th, when the clock will be put back one hour.

Will the Colonies make their own Machines?

A Colonial motor cyclist, in a recent conversation with us, was most emphatic that unless British manufacturers built real Colonial models all the trade would go to the U.S.A., and that finally the Colonies would enter the manufacturing world themselves. In Canada and Australia steps are being taken in this latter direction already.

Imports and Exports.

This month's returns show an increased value of £191 on imported motor cycle parts over the figure for August, 1917. The exports, however, show a considerable reduction, being £27,970 less in value than those for August last year. The figures are tabulated below:

IMPORTS FOR AUGUST.

1918.—Parts .. £2,608. 1917.—Parts .. £2,417.

EXPORTS FOR AUGUST.

	1918	1917
Motor cycles	£26,531	£77,413
Parts	£29,337	£27,970
Total	£55,868	£105,383

THE MOTOR CYCLE

AVIATION SECTION

A Novice's S.O.S. The Pioneer Service Airman. A New Use for the White Flag.

To Canadian Lines by Parachutes.

It is reported that by means of parachutes the crews of two wrecked German aeroplanes descended in the Canadian lines.

Flying and Motoring.

An officer of the Royal Air Force, who was fined 30s. at Kingston recently for driving a motor cycle at 28 m.p.h., wrote in excuse: "Flying does not tend to improve one's judgment of low speed."

Eight Machines Down in Five Days.

Capt. Edward Mannock, R.A.F., recently awarded a Bar to his D.S.O., brought down eight machines in five days. It is stated that as a patrol leader he was unequalled.

S.O.S. from the Air.

The *Daily Sketch* says: "Returning from his first solo spin, a very youthful airman-cadet persisted, greatly to the annoyance of the senior instructor, in circling the 'drome. At length from the 'plane came a note, which read: 'Throttle jammed; send for ambulance P.D.Q.' By signs, the novice was induced to knock out his switch, and the ambulance was not required."

The Right Spirit.

An American officer who was a familiar figure in former Pacific Coast motor cycle activities is now acting as an observer in the American Aviation Corps. In July, when he was doing reconnaissance duty at 600ft. above the German lines, he was fired at by a machine gun from the ground, and his foot was shattered. "I used to love to hunt ducks," writes Lt. Herold, the officer in question, "but now I know how it feels to be a lame duck. I am anxious to get healed and get back into action again. My leg will never be the same, but I see no reason why it should interfere with my work as an observer."

Who was the First Sailor to Fly?

We recently met a naval officer whose name has been connected with the movement from its earliest stages. A short time ago, in a certain naval mess, a discussion arose as to who was the first sailor to fly in an aeroplane. Incidentally, he told us he would like to know who was the first soldier to fly in an aeroplane. If any of our readers can furnish us with these details, we are sure they would be of great interest from an historical point of view.

Honour for Italian Airman.

In the name of King Albert, General Norel has presented Major Gabriele d'Annunzio, the celebrated Italian poet and airman, with the Belgian Croix de Guerre.

The White Flag in a New Sphere.

The Gazette mentions what is probably the first recorded instance of the use of the white flag in the air.

Capt. G. E. Gibbs, who has been awarded a second bar to the Military Cross, repeatedly dived on a Hun machine. The Germans waved a white flag and landed, followed by Capt. Gibbs, who took both occupants prisoners and the machine intact.

Perils of the Air.

The *Daily Sketch* says: "Engine trouble at 12,000 feet caused one of our young airmen to crash. He fell clear of the remnants of his 'bus, but found himself suspended by his belt from some strands of barbed wire. So, with his jack-knife, he operated upon his belt so effectively that in the resultant tumble he broke his nose. His brother officers now find joy in asking him to lecture on "Some Perils of the Air." Although the report does not say, the landing was, presumably, on our side the line.

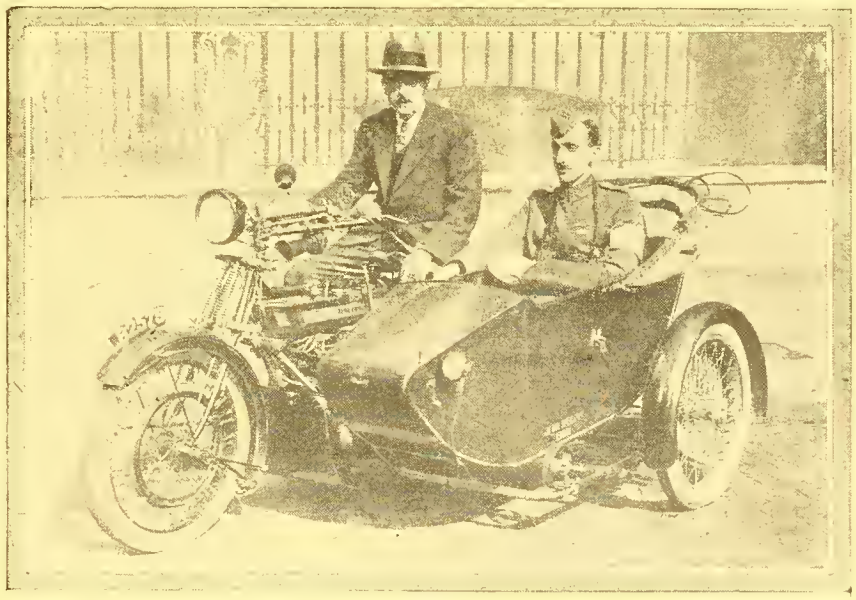
Capt. H. W. Woollett, D.S.O., M.C., R.A.F.

The recent award of the D.S.O. to Capt. H. W. Woollett, M.C., R.A.F., was in recognition of his having destroyed eight enemy machines in two nights, which made his total twenty-two.

An Airman Motor Cyclist.

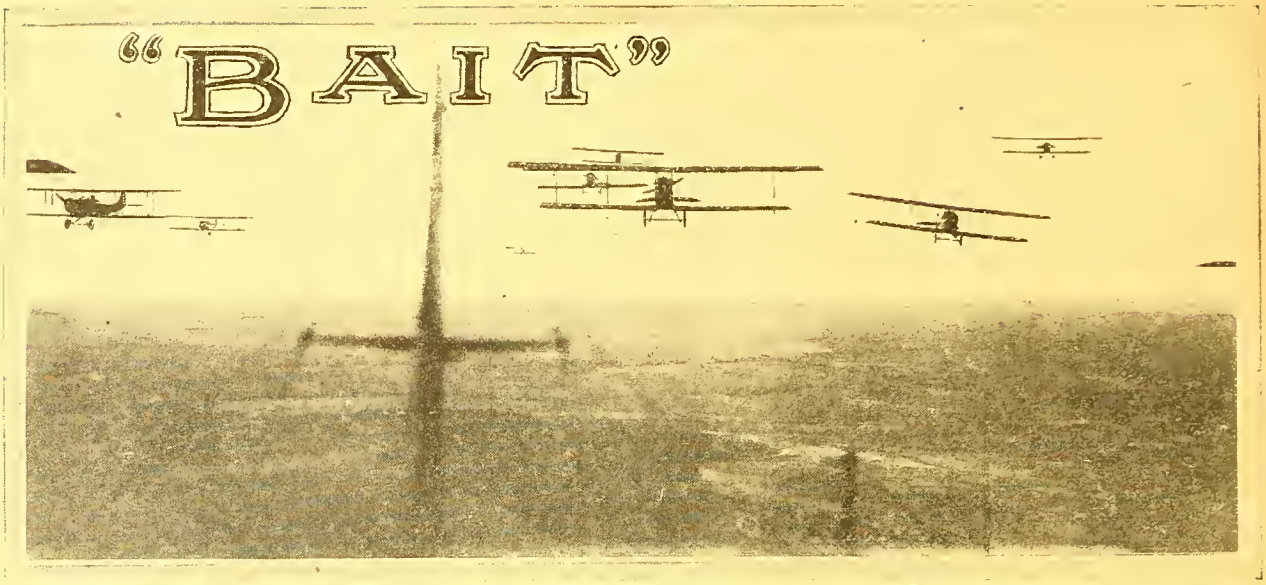
The accompanying photograph shows Capt. F. J. Davis, formerly representative of the Enfield Cycle Co. in Wales and the North of England. Two years ago he joined the R.F.C. as a cadet, took his wings in July, 1917, went to France the following November, and was gazetted captain on June 9th last.

While flying scout machines when in the R.A.F. he had many interesting experiences, and eventually gained the D.F.C. for general good work and destroying Hun machines, of which he shot down quite a number. Shortly afterwards he received a severe wound in the arm in the course of a dog fight with a circus of Fokker biplanes, consisting of twelve English *v.* eighteen German machines, five of the latter being shot down. Davis was wounded at the very beginning of the fight, but, fortunately, succeeded in landing some three miles inside our lines. The accompanying photograph shows him in an Enfield sidecar while still convalescent.



Capt. F. G. Davis as a passenger in a Royal Enfield sidecar.

"BAIT"



Aeroplanes in flight. A photograph of cross-country formation flying, taken from one of the aeroplanes. Eleven aeroplanes are shown on this photograph.

"NO. — Squadron will provide six machines, flying at a height of 10,000ft., to collect as many enemy aircraft as possible. They will endeavour to lead these machines to P—— Wood at 10.30 a.m." The Major scanned the faces of the three interested Flight Commanders sitting round him. "The idea, you see," he continued. "is that we shall act as bait to attract as many Huns as possible and then let the scouts get at them. Now who's going to do this?"

"Oh, let me do it, sir, will you," cried one, a lanky youth with a mass of unruly fair hair and an incipient moustache. "I'll give the beggars bait. Why, I bet——"

"Wait a minute, Stivens," said the Major, good-humouredly. "I'm not so sure your flight is strong enough to tackle a job like this."

"Oh, I think it is, sir," Stivens went on. "Besides, we shan't be doing much scrapping. It's just to collect these fellows, apparently."

The Scheme.

The Major lit a cigarette and gazed unseeingly into a far corner of the hut. "All right, Inky," he said at last; "then 'A' Flight can do the early morning patrol and 'C' can do the evening one. You other two can go then, and I'll talk over this show with Stivens. Now then, Inky," he said, when the others had gathered up their notebooks and departed. "I had a confab with the Colonel this morning, and what's going to happen is this. There will be all the scouts of the —— Wing sitting up at 15,000 over P—— Wood at 10.25. You will wander round as many Hun aerodromes as possible, collect all the Huns and put them down under the scouts at 10.30 sharp. No getting into hot water and arriving late, or you'll find yourself in a hole. Now what time do you think you'd better start?"

Stivens considered for a moment. "Well, sir, half an hour over the lines will be enough for that, three-quarters for getting there. I should think about 9.15." "Right," said the C.O. "Pow-wow on the aerodrome then at nine o'clock; leave the floor 9.15."

It Develops.

All was bustle and activity as the Major and the Flight Commander strolled down to the hangars the following morning, the latter looking like some prehistoric monster in his gigantic leather flying coat and cap. Lewis guns were popping as they were finally tested, and there was a low murmur from the big 250 h.p. Rolls engines as they were gently "ticking over."

"Everyone here?" said the C.O., as he came up to the group waiting beside the F.E.'s.

"And you all know your positions?" There was a murmur of assent.

"Right. Now I want you to listen to me a minute, you fellows. This is rather an important job you've got on this morning—one that will require some considerable skill in handling. Now a leader can't think of these things if he has to be continually thinking of his formation. It's you who must keep in formation with him, not he with you. So it's up to you fellows to do your best. You should all be able to keep decent formation by now, and if you can't, you will only be a danger to your pals, and will not be wanted in this Squadron. I shall want Stivens to report on the formation when he returns. Got that? Right. Off you go."

The youths broke off and scattered to their machines, and there was a nerve-shattering roar as the various engines were opened up for their final test. This died down as the leader slowly taxied out, the streamers on wing tips and tail fluttering gaily in the breeze. The remainder of the formation slowly took up their positions behind. Then the leader slowly opened his throttle, the tail of the machine came up, and quickly gathering speed the battleplane left the ground.

'Bait."—

Some threequarters of an hour later, anti-aircraft look-outs might have observed six small dots crossing the lines close to the town of A—— and turning south-east towards the large German-held town of L——. These would be our friends.

Stivens having led his formation over this town, now scanned the sky for possible Huns, but to his disgust found no signs of a hostile formation, and, as "Archie" was doing most unpleasantly good shooting, he turned still farther south towards D——, once Headquarters of the German Flying Corps, where trouble may always be found.

Having got halfway there, he saw a formation of some fourteen Huns laboriously climbing below him, so he made a long slow turn which eventually bought him facing north again, and about twelve miles into Hunland. He headed along on a course parallel to the lines, passing behind the town he had first made for, then just west of the Hun scout aerodromes in the valley of the L——. The enemy were now joined by another formation of about fifteen machines, and had climbed up above and just behind our friends. Seeing that the latter were making no attempt to head for the lines, however, the Huns did not attack, leaving our observers to stand watching them over the top planes and to finger their guns in a fever of impatience.

Stivens still continued his northern course, then seeing that he was pretty well on a level with P—— Wood, which was his objective, and that it was 10.20, turned west towards the wood. At this moment two more blocks of Huns arrived, making a total of forty-two enemy machines behind the Britishers.

The Fight.

Directly Stivens turned for the lines, the formation was attacked. The former, however, was expecting this and turned clean about. The next five minutes was an absolute medley. Guns were going in all directions, and the long streams of the English tracer ammunition could be seen crossing the smoke trails of the Huns' explosive bullets. Machines were diving and turning in all directions, and the six F.E 's seemed to be in a couple of dozen places at once, the observers clinging to the back-mounting for dear life, and firing away over the top plane while the pilot manipulated the front gun.

Then just as suddenly as it had started all was quiet. The Huns had drawn off. Stivens looked round, inwardly quaking, and breathed a sigh of relief as he saw that five F.E.'s were collecting round him again. So they had lost no one then, and he grinned gaily at his observer, who was doing a *pas seul* in the rear seat. The latter held up two fingers and pointed to himself, and then another and pointed to Stivens, showing that they alone had nabbed three Huns. Stivens himself had seen eight Huns go down—six in flames and two in that awful leaf like fall which shows that a machine is out of control.

He glanced at his watch, cursed valiantly, and pushed his nose down for home. For the little scrap had lasted altogether nearly eight minutes, and it was already two minutes to the half-hour. This action bucked up the Huns, still thirty in number, who had been hanging irresolutely above them, and they came on hard behind, occasionally pecking at the rear machines, which was just what Stivens wanted. The machine, however, seemed to be absolutely crawling, while the minutes fairly flew, and Stivens thought he would never get to the wood. At last it loomed up below him, and, looking up, he saw the many specks which were English scouts. The Huns, seeing they were rapidly approaching the lines, once more plucked up courage and dived at the six planes. The scrap, though, was very short-lived, for scarcely had they got within range when the scouts were on them. Stivens turned, hoping to get some pickings from the general mix-up, but there were so many English machines about that he gave it up in disgust, and dived off home.

The Return.

He had crossed the lines some while and nearly reached T—— before he fired his white light, and on this being answered by the remainder, the formation broke up, and each made his own way home. . . .

The Major was waiting on the aerodrome when they arrived, and, as soon as Stivens had descended from his machine, was strolling towards him.

"Well, how did everything go?"

"One of the rottenest formations I've ever led, sir; those fellows want about three weeks' practice formations."

"Oh, was it a failure then?"

"Well, no, sir. We got about thirty Huns to the wood all right, though I was about two minutes late."

"Did you have to scrap much on the way?"

"We got into a bit of a scrap, sir, just before the end; there were forty-two of the swine. I think we got eight of them"

"Good gracious, man, eight of them—without a casualty—eight! I can see that this needs a little dinner. Herd your flock into the office, will you, for combat reports?" And the Major rushed off, chuckling.

"Hullo, sir, hullo! Yes, sir, this is O.C. —— Squadron speaking. Hullo—yes. Stivens is just back from the show. He says he collected forty-two Huns; got into a little scrap coming back and downed eight. Yes, sir, six in flames How did the scouts get on? Only four—oh, that's bad luck. Thank you, sir." And the Major slammed down the telephone receiver and turned excitedly to Stivens, who had now entered the office. "All those blooming scouts only got four Oh, this is going to be 'some' dinner."

Late that night some eighteen flushed youths might have been seen sitting round a dinner table. Dinner was over, the port had been racing, and two or three toasts had been drunk.

The Major rose from his seat at the head of the table with a brimming glass in his hand. "Gentlemen. I have to propose the health of the hero of the day—our friend Inky. It isn't many fellows who can scrap forty-two Huns and get away with it. Here's to him."

The toast was drunk amidst cheers and shouts, and as they sat down Inky was called on. "Come on, Inky. Speech! Speech! On your feet. Up you get, you bounder!" Stivens, who was cowering in his chair in an ecstasy of terror, struggled to his feet for a second.

"Oh, shut up, you fools," he muttered, and sank once again into his chair.

Wanted, a Non-flam. Aeroplane.

WHEN statistics are eventually published we shall probably find that if burning aeroplanes accounted for a very small percentage of our flying casualties in the great war, yet the total number of deaths ascribable to this cause was formidable. It should, of course, be realised that under such conditions death by fire is usually as merciful as any other form of death, since the occupants are generally unconscious through concussion or wounds or suffocation before the conflagration develops. This is explained by the fact that a fire in the air is practically unknown, except as the result of enemy action —incendiary bullets and the like; aircraft engines are very thoroughly safeguarded against self-ignition. Still, the risk of a flare-up in a landing mishap of an otherwise petty character is always present, and illuminates the value of a non-flam. aeroplane, driven by a non-flam. fuel.

When passenger-carrying aeroplanes are developed on a commercial scale in peace, this ideal will receive far greater prominence. Civilians are more imaginative and nervous than soldiers. A single flare-up, in which, say, twenty civilians were injured through the landing crash of a small cross-Channel liner, would horrify Europe and do much to make aerial passenger routes unpopular. Such a tragedy is bound to occur so long as petrol or its allied spirits are our sole aerial fuel. The tragedy will probably not occur until we have outgrown the callousness about human life which the war has bred in the most humane of us: and it will appal Europe. Legislation safeguards for the escape of passengers from aerial liners will come into force. Aeroplane design will be complicated by this problem.

Another Fuel Problem.

It is thus obvious that fame and fortune await the benefactor who can free the coming mode of locomotion from what must remain its ghastliest peril so long as petrol engines are employed on aircraft. Invention can free, perhaps has already freed, our juvenile aeroplanes from all real risks of conflagrations at altitude due to natural causes. A non-flam. structure presents no serious problems. But so long as the tanks contain dozens of gallons of a highly inflammable spirit, and a "crash" can bring leaking petrol into immediate contact with red-hot metal, catastrophes must be possible. TORQUE.

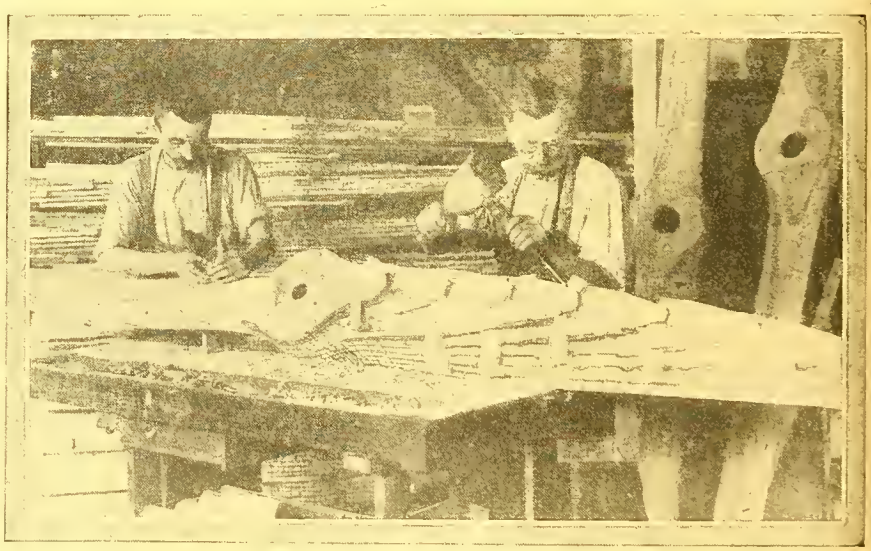
PRODUCING THE PROPS.

IT is remarkable that, in an era supposed to be the age of steel, the most wonderful machine of these enlightened times, *i.e.*, the aeroplane, is an engineering proposition in which steel and metals generally are used but very little excepting in the engine. We may exclude the engine as being an offspring of the automobile engineer, but at every other point of an aeroplane other industries have been impressed.

Wood, wires, and fabrics largely compose the aeroplane, and while the all-metal machine may ultimately fructify, for the time being aeroplane manufacture is in the hands of new branches of woodworking industries. It is, perhaps, at the propeller where the respective spheres of the woodworker and mechanic apparently overlap. To the lay mind it seems almost absurd that the propeller is made of wood; yet it is significant that, despite many attempts to produce a metal "prop," the standard propeller is of laminated wood. The illustration shows a "prop" in course of construction in a Hun aeroplane factory. It will be seen that the "prop" is cut from a "block" composed of layers of specially selected woods.

The strength of this form of construction is easily appreciated by the man in the street when he recalls the enormous strength of the tea chest, which is exceedingly light, and, while carrying heavy loads, withstands a great deal of ill-usage, and does not split as would a case made of ordinary planks.

Ply wood probably is the strongest material for its weight, and has the additional advantage that there is a certain resilience which does not exist with metal of the same bulk. However, whatever the difficulties of manufacture and disadvantages of the metal "prop," it is certain that the wooden propeller so far has proved to be the best, but probably, after the war, more extensive experiments will be carried out in both directions.



Making props for German aeroplanes. A photograph taken in a German aeroplane factory.

HERE & THERE WITH THE LUXURY TAX.

Opinions, Public and Private, on the Latest Blow aimed at Motoring.

TAXATION is always a grievous and controversial subject, and taxation of the motorist seems to be so *par excellence*. The Luxury Tax proposals, at first sight a severe possible injury to the motor industry, proved to be no exception. With the idea of collecting a few outside opinions, a representative of *The Motor Cycle* took every opportunity of discussing the proposals with all with whom he came in contact. Strange to relate, in many quarters, both in the motor trade and in such purely luxury trades as the jewellery industry, the tax was regarded with indifference. It was, indeed, a case of "Never trouble trouble till trouble troubles you."

Motor manufacturers at the present time are engaged almost exclusively on munitions, and are too busily occupied to think about possible weakening of their post-war trade positions by blows delivered in roundabout semi-secret ways in the form of a sop to labour agitators. The motor trade is too busy on war work to think of what may come when the war's artificial prosperity is no more. The attitude shown in most quarters was: "We are not making for private markets; when we are, then we will consider them. Till then, the markets do not exist, and we have no interest in possible restrictions on their future growth."

To one who was expecting to find the trade seething with indignation against what some people were inclined to regard as a dire catastrophe, it came as a bit of a blow to find the managing director of quite a well-known firm "entirely without opinions on the matter," as he expressed himself.

Opinions—Bases and Types.

Obviously it was a case for further enquiry, and so we took the earliest opportunity of interviewing many important motor cycle firms. It is interesting to see that the greatest attention was paid to the tax by those firms who have been best known for the quality of their productions, although this probably has no particular significance. The more successful and enterprising the firm interviewed, the more interest did it show in the proposals before it. This, of course, does not necessarily mean that each enterprising firm has the same opinions, but it does mean that those firms whose goods have not attained any large measure of success are most inclined to regard the tax with indifference.

There are two distinct lines of thought in connection with the Luxury Tax proposals. One is that someone has got to pay for the war, and payment will have to be obtained by means of high taxation such as has never been known before, and it would be absurd as well as useless to cry out against it. Moreover, the expense or the price of any particular commodity will not, to any appreciable extent, affect its sale after the war, because money will be so plentiful.

The other line of thought adopted is that, under present conditions, and under the conditions that may be reasonably expected to obtain for some time after the war, a motor vehicle of any class should be regarded not as a luxury but as a necessity to all engaged in business that is not absolutely limited in its geographical scope. By this latter school the tax is regarded as absolutely unjustifiable, and as a matter that should be fought out to the last cartridge.

As is usually the case when one has two extreme points of view, the most tenable aspect is generally found to lie somewhere between two extremes.

A War Tax Only?

There is perhaps one point that may as well be examined before proceeding to a criticism of the above two points of view, and that is, is the tax to be a post-war tax or is it simply a temporary measure? The average man will be inclined to regard the tax, for all practical purposes, as a permanent institution, but it is surprising to find how many there are amongst those primarily concerned who look upon the tax as purely a temporary measure to be abolished at the earliest possible opportunity. We would remind those who hold this opinion that this was the real nature of the income tax. Income tax was introduced purely as a temporary expedient to pay for a war at the rate of something like 6d. in the £, and it was to be annulled at the first possible opportunity. The only change that has taken place in income tax since its introduction is an increase in its amount, and, of course, there will be no need to remind most of our readers that the amount is still on the increase, and is likely to be so for some time. Consequently, we may as well decide that the tax is to be a post-war measure, without going into the question as to how long after the war it will remain in force, and base all our arguments on the assumption that we shall be suffering from the tax when we are struggling to re-establish industry on a peace basis. If the tax should by any chance be a war measure, then (as we have already stated in the issue of August 15th) we have no criticism to offer against it except, perhaps, that it is absurdly superfluous.

Paying for the War.

Turning to the two lines of thought already outlined, we come first to the question of paying for the war. It is really rather surprising that so many Englishmen would be the last to suggest, or even to entertain for a moment, the idea that we are not coming out top dogs in this war, yet all the same they say that we

Here and There with the Luxury Tax.—

shall have to pay for it. Why should not the Germans pay? Of course, much has been said and written about the ability of the Germans to pay, and to anyone to whom the subject is still a doubtful matter we cannot do better than recommend an article over the signature of "Politicus" that was recently published in *The Fortnightly Review*, and briefly reviewed in the September issue of *Pearson's Magazine*. The arguments are too well expressed for us to attempt any elaboration, and they are rather too lengthy to be dealt with here, as well as being outside the province of a motor cycling journal, but anyone who reads with an open mind the conclusions put forward must be driven into the belief that Germany will be able to pay for this war.

Then opinions are very divergent on the question of the distribution of wealth after the war. The answer to this question depends to a large extent on another which is very difficult to answer, which is, is the average war profiteer practising thrift with his earnings, or is he a spendthrift? The position of the market *immediately* after the war is less hypothetical, and also to a large extent immaterial, because manufacturers will not be working on a productive basis. The time to which we must direct our attention is, say, three years after the war, when the production of all home factories is again well established. What we want to find out, if possible, is whether the increased cost of motor cycles, due to the Luxury Tax, will seriously restrict their market.

Adam Smith's Fourth Canon of Taxation.

It has always been a canon with political economists that an increase in the cost of a commodity restricts its market, and it is extraordinary to find that many members of the motor cycle trade are of a different opinion. Their attitude is that if a man wants a motor cycle he will have it, whatever the price, but they overlook one or two considerable factors. For instance, some manufacturers maintain that if a man has not the money to buy a machine he will save until he has, and consequently the machine is sold just the same whatever the price. This delightful little argument overlooks the fact that if the man had not had to save he would have bought the machine earlier, and, as things are in the motor cycle world, would probably have been ready for a second machine at the time when—as a result of compulsory saving—he is ready for his first. In other words, it is within the bounds of feasibility that the increased cost of such an article as a motor cycle may not apparently limit its market to a very serious extent, but will obviously make the market spread over a longer time, if one may be pardoned for such a loose method of expression. Surely it should be clear from the above that a market spread over a longer time is, in effect, a restricted market. There are, of course, always people willing to buy motor cycles, but a great many of them are very restricted in the amount they may spend; consequently the market will be restricted, and who will suffer? Not would-be motor cyclists, but the motor cycle manufacturers, and by manufacturers, of course, must be understood not only employers, but workers, and everyone engaged in the trade. The tax, in other words, will strike a severe blow at industry, and especially at labour. Superficially, of course, the tax is a tax on people who can afford to pay, and as such is bound to appeal with considerable force to the ignorant, uninitiated, ranting section of labour. As we have tried to show, those people who are now most enamoured of the tax will eventually be the greatest sufferers.

As regards the second line of thought in connection with the tax, this has already been very ably presented to the Government in a letter sent out by the Cycle and Motor Cycle Manufacturers' Union, and as the gist of the letter, a copy of which we append herewith, admits of little difference of opinion, we do not intend to deal with this aspect on this occasion.

The trade must realise all these things, and must make an effort to combat this state of affairs before it is too late. It should realise that it is indeed "up against it," and acting the ostrich will not save the situation. The trade must help itself and fight its own battle, and it is the main object of this article to remove to a large extent the feeling of indifference with which the tax is regarded in many trade quarters.

General Aspects.

As regards the general aspects of the tax, they are very difficult to deal with at this early stage. Superficially, the tax would appear to put a premium on shoddy goods. The whole basis of the British industrial prosperity—the reputation of producing first-class workmanship—is struck a severe blow by the imposition of such a tax. It will be the aim of every manufacturer to keep his goods as cheap as possible, and the result of this is bound to undermine the reputation of English workmanship.

We have already pointed out that the motor cycle is proportionately the most highly taxed vehicle on the road, and to tax it still further is an effort to tax out of existence a vehicle which is the product of an industry of real national importance. From a purely economic point of view several criticisms may be levelled against the tax, but as they apply to other articles, and we are only concerned with motor cycles rather than with the tax as a whole, we may pass them over with a brief indication that political economists have long been agreed there is only one thing worse than a tax on a commodity at the time of its final sale, and that is a tax on a commodity at the time of its production. In either case the yield to the State as the result of the tax is entirely outweighed by the cost of collection, and thus the tax is bad for everyone concerned.

The following is a copy of the letter sent to each of the members of the Select Committee that considered the Luxury Duty by the Cycle and Motor Cycle Manufacturers' Union:

Re Proposed Luxury Tax, Motor Cycles.

Dear Sir,—This Union is completely representative of the motor cycle manufacturers of Great Britain, and I am directed by my executive committee respectfully to urge—

> "That with the existing regulations, under which petrol is not allowed to be used except by such motor cycles as are exclusively devoted to work of national importance, or to essential business purposes, it would be altogether unreasonable to classify motor cycles as luxuries."

My committee would gladly offer its services in case you should desire information on any point upon which, in your opinion, it may be competent to advise.

Alf. Bednell, C. and M.C.M.U.

ALCOHOL-CARBIDE FUEL.

Some Experiments with Alcohol a Decade Ago.

THERE is no necessity to reiterate the many statements made in these columns concerning the importance of home-produced fuels. At least, every motorist knows and appreciates this, and his interest is not a selfish one entirely.

The war has brought about many reforms, and scrapped old ideas. It has taught this island country that it is not only necessary, but quite possible, to be self-supporting in many respects; but, owing to several factors which need not be discussed here, no progress has been made toward the production of fuel for internal combustion engines.

Many times in these columns both alcohol and carbide have been suggested, and usually the appearance of such suggestions has been the signal for spirited correspondence pointing out the advantages and disadvantages of each. Usually the use of acetylene gas as a fuel is considered merely as the suggestion of madmen who have overlooked T.N.T. and gunpowder as a propellent, hence the following particulars of experiments carried out with alcohol-acetylene gas will be of interest. These experiments took place over a decade ago, but no doubt the data obtained will not be allowed to be lost when it becomes really necessary for America to consider seriously the production of other fuels than mineral oils. The experiments in question were concerned with an invention of Mr. Thomas L. White and Mr. F. W. Barker, of New York, who were granted letters patent on it (No. 839,798) in December, 1906.

General Principles.

In all experiments that have been made to utilise alcohol as a fuel for internal combustion engines of the "automobile" type, as distinct from the heavy slow-moving engines used for marine and stationary purposes, it has been found that large quantities of fuel were consumed in doing a given amount of work. This disadvantage seemed entirely to eliminate denatured alcohol as an economical competitor of petrol, even if the cost of the two fuels were the same per gallon.

Another serious objection was that an engine could not be started on alcohol without priming with petrol or heating of the carburetter.

It was to overcome these serious faults that the Barker-White process was invented, and after extensive experimenting it was claimed that an ordinary 3½ h.p. De Dion engine could be started cold on the new gas, which was given the name of "Alkoethine," being an intermolecular union of the hydrocarbons of alcohol and acetylene.

Stated in the briefest form, this process consisted in atomising alcohol and air in an ordinary float feed carburetter and then passing the vapour through or over a layer of calcium carbide before it enters the combustion chamber of the engine.

The results of the experiments referred to were claimed to have been all that was anticipated, the gas developing efficiency quite equal to petrol. So far as can be gathered, the experimental apparatus was unsuitable for the making of quantitative tests, but everything pointed to about equal economy with petrol for a given amount of work when the prices of alcohol and petrol were the same.

Theoretical Aspects.

The theory upon which the invention is based is very interesting. Alcohol requires a high temperature for ignition, considerably higher, in fact, than petrol, and it burns slowly, rendering it unsuitable for high-speed engines. The most successful stationary alcohol engines have very high compression, as high as 120 lb. per square inch, and have maximum speeds of from 200 to 300 r.p.m.

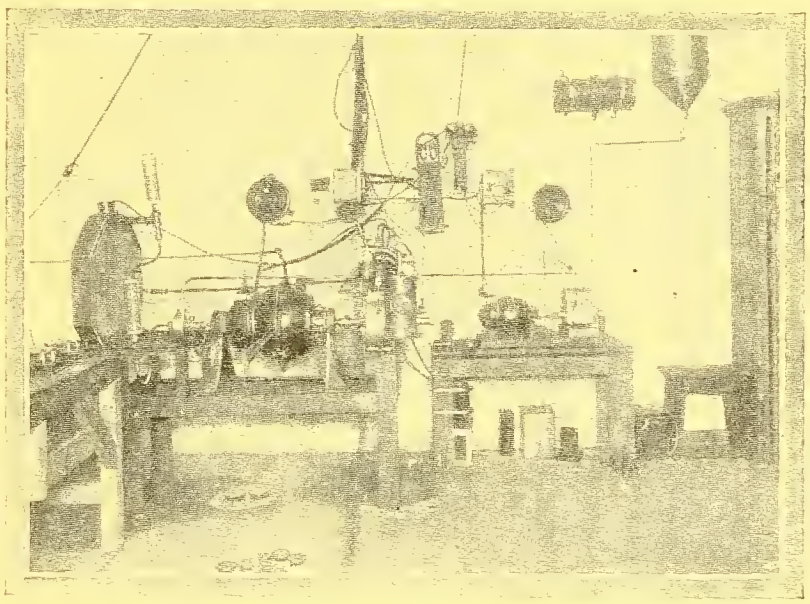
In all commercially pure alcohol there is a considerable percentage of water, usually 10% or more, which cannot be got rid off at reasonable expense by distillation. This presence of water is decidedly objectionable, since it cannot burn, and tends to make ignition more difficult. When the alcohol vapour is drawn through the calcium carbide by the suction of the piston a large part of the water unites with the carbide and liberates acetylene gas, which requires less heat to ignite than petrol vapour, and burns so rapidly as to have almost a detonating action. Acetylene gas is so explosive in character as to be destructive when used alone in an internal combustion engine, but by intermingling it with alcohol vapour in suitable proportions the objectional properties of one counteract those of the other, so that a complex hydrocarbon is formed that has properties very closely resembling those of petrol. The molecules of acetylene distributed through the charge in the cylinder detonate virtually at the same instant as soon as the pressure of compression is increased by expansion due to the heat of the electric spark, and each burning molecule of acetylene sets fire to the molecules of alcohol gas in juxtaposition with them, so that the charge is fired very suddenly, much more so than with a pure alcohol gas, in which the flame has to be propagated progressively through the gas from the sparking plug.

Quick burning is a decided advantage as the highest efficiency of an engine is developed when combustion of the charge is completed at the instant of maximum compression, and only expansion occurs during the travel of the piston. With high-speed engines pure alcohol gas frequently is not completely burned when the exhaust valve opens, and there is a large waste of fuel.

Heat and Vaporisation.

When calcium carbide is decomposed by water, the chemical action generates heat, which usually is a nuisance in the generation of acetylene, but in the Barker-White system this heat is utilised to vaporise the alcohol. In the experimental apparatus, all the air that was passed into the carburetter was heated in a copper sleeve that surrounded the short exhaust pipe, so that it took up as much of the fluid as possible, and as the vapour passed through the carbide it was further gasified by the heat liberated, and condensation was prevented. This in itself is, of course, very desirable.

Despite the application of so much heat, it is said that the gas was quite cold when it entered the cylinder. Even the carbide chamber remained perfectly cold when the engine was running, showing that all the heat was used in vaporising the alcohol.



The apparatus used in testing the Barker-White system of using alcohol-acetylene gas.

(With acknowledgments to "The Rudder," U.S.A.)

Alcohol-Carbide Fuel.—

It was considered that 1 lb. of carbide would furnish the heat necessary to evaporate approximately 2 lb. of absolute alcohol.

In the experiments referred to, it was found that the engine ran better with an addition of considerable water in the alcohol. The best proportion was found to be 17% or 18% of water, as shown by a scale on a specific gravity hydrometer. A wide range was possible, however, extending from pure alcohol, after the engine had been started and got warmed up, to a solution containing 25% of water.

Explosive Range.

The presence of a larger proportion of water resulted in the generation of too much acetylene, which gave the mixture too much of a detonating character, and caused knocking. With the alcohol-acetylene combination there was also a much wider range in the proportions of gas and air through which perfect combustion occurred than with petrol. With pure acetylene and air the range was extremely wide, varying from the proportion of one part gas to three parts air all the way up to the proportion of one part of acetylene to twenty-two parts of air. With petrol vapour the range was from one to eight parts to one to fourteen parts, while with the "Alkoethine" mixture the range through which perfect combustion occurred was somewhere about halfway between these two, and with pure alcohol the range was much smaller than with either of the others.

When running on pure alcohol it was found necessary to advance the ignition much more than with petrol, because of the slow burning character of the fuel, but by the use of calcium carbide and the 18% admixture of water and alcohol the ignition point was brought to about the same as with petrol, or somewhat retarded. More heat was radiated than with petrol, which was demonstrated by Centrigade thermometers connected with the circulating system.

The Apparatus Used.

The apparatus used in these experiments consisted of a single-cylinder w.c. 3½ h.p. De Dion engine, an ordinary float feed carburetter taking air from a sleeve surrounding the exhaust, a large brass carbide chamber with a diaphragm of wire netting on which the carbide rested, suitable fuel tank and piping, circulating and radiating system, and a direct coupled dynamo with a field freely suspended for measuring the electric drag to determine the power developed.

So far as can be gathered, no attempt was made to design the most suitable form of gasifying device, and the carbide chamber was undoubtedly larger than was necessary, and it was thought that better results would have been obtained by spraying the alcohol directly upon the carbide.

Running Data.

The normal speed of the engine was about 1,100 r.p.m., but on the alcohol-acetylene gas it was speeded up to 2,100 revolutions, with a greater efficiency than that of petrol at the higher speeds. The engine had a compression of 65 lb. to the square inch. Indicator cards taken with a manograph machine showed pressure curves equal to or exceeding cards taken from the same apparatus when running on petrol, with a high peak running above 240 lb.

What is most important, there was no perceptible pitting of the valves or cylinder walls, and no corroding or other signs of chemical reaction.

The Future.

A Mr. Jos. Tracy, in March, 1907, gave a demonstration at his laboratory in New York to a number of gentlemen interested in the manufacture of automobiles, all of whom appeared to be impressed with the immense possibilities of the Barker-White process. Since 1907, however, little has been heard of any developments in this connection, and probably, as the need for an efficient petrol substitute was not so great then as it is now, the inventors were not encouraged to proceed with the system.

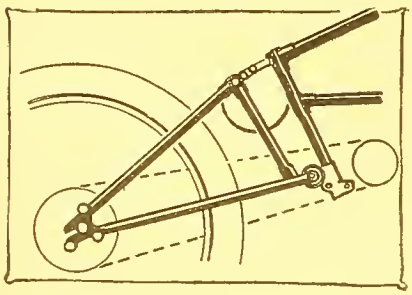
The foregoing particulars and figures have been culled from an article by a Mr. H. W. Perry, which appeared in our contemporary *The Rudder* in 1907, which paper holds the same international position in the world of marine motoring as does *The Motor Cycle* in the field of motor cycling.

Without doubt, if acetylene and alcohol could be harnessed together—and the above indicates that they can—there appears to be in this system the nucleus of a new fuel which only waits for our scientists and the Government to develop and render the motoring world independent of oil trusts and future menaces like the U boat

A Harley-Davidson Flat Twin?

Coming Events Sometimes Cast their Shadows through the Patent Files.

ALTHOUGH the Indian light twin was not the first flat twin motor cycle to be produced in the United States, it was the first to be made by an American concern of international repute. There appears no doubt that it has been a success, and, but for the war, quite a number of them would have been seen in this country. At the time



The Harley-Davidson spring frame.

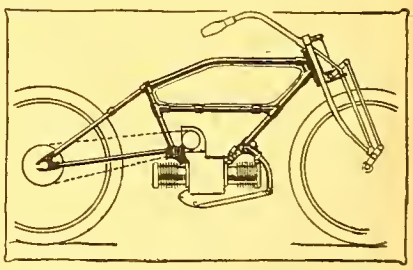
this model was announced it was anticipated, at least by British motor cyclists, that other American makers would follow suit. The American patent files now reveal that the Harley-Davidson concern is interested in a flat twin proposition, which includes a gear box integral with the crank case. No particulars are available as to the bore and stroke of the engine, but apparently these are to be a little larger than those of the Indian, and from the illustration given here one may think that the new Harley, if it fructifies, will approximate more nearly to the British 3½ h.p. size.

A separate patent has been granted for a spring frame, which obviously was designed for the flat twin machine; but, here again, the details are meagre in the extreme. However, the bare fact that a firm holding the position of the Harley-Davidson Motor Co. has designed a flat twin with a spring frame is of more than usual interest.

The Flat Twin in America.

Considering the experience of Americans with opposed engines, it is somewhat surprising that more flat twins have not been forthcoming, as, in addition to the Indian, the Bayley-Flyer, and the auxiliary attachment described a few weeks ago, this type of engine has been used extensively in tractors, motor boats, delivery vans, and for stationary work. Taken altogether, America probably has produced more flat twins than Great Britain; but it was left to this country—to the Douglas and A.B.C. companies particularly—to demonstrate the suitability of the type for motor cycles.

It will be rather interesting to see if "flat twin fever" spreads in the States, as it has here, to the car world.



A Harley-Davidson flat twin with integral gear box.

PETROL FOR PLEASURE.

PRIVATE cars and motor cycles may not be used for "pleasure" purposes, nor motor chars-à-banc and motor boats, but how is it one can charter a taxi or motor "hackney" carriage to go to the golf links? We presume this is not pleasure motoring, because it is used for the business of the owner; but were not the motor chars-à-banc and motor boats in a similar category? It is very perplexing.

With the ambulance sidecars in France. One of the drivers is having trouble with his passenger. When such a thing is likely to occur the sidecars keep together in case of mishap.

THE HOMES ON THE HILLSIDES.

"EVERY sidecarist is to spend three days per month down at the base for rest and for overhauling his machine." So said the commandant, and the sidecarists boldly answered "Rats" —or the equivalent thereto. Also they added to the above—"and the commandant's machine, so be it if it is necessary."

Each year the sidecarists are told that three days' repose per month are their due; each year they realise that it is merely a tradition of the section, and that three days can only be won at the cost of a broken frame and endless backchat from the commandant. Still it looks well on paper. The new man coming out is informed, "Well, of course, you will be up at the front line, etc., etc., but you come back here at the beginning or end of each month for three, etc., etc.," and the newcomer takes hope, and incidentally takes less underclothing than he finds he requires at the end of nine weeks.

But the writer holds a record. Recently he obtained not only the traditional three days, but five days in addition. It happened thus. Somewhere in the correspondence columns of the semi-technical press there recently appeared a passage to the effect that every motor cyclist who has served for any length of time under front line conditions suffers from rheumatism, and so on. The writer pondered. He decided to have rheumatism. He decided to have it in the left arm and hand, so that he could not declutch with sufficient certainty to avoid imperilling the gears, and he decided to have no mild attack either.

A Nation of Workers.

The command was inclined to scoff at so slight an ailment till it was explained that the attack endangered the gear box, and that unless it was nipped in the bud by rest, good feeding, and warmth, it might cost several gear boxes. That did it, and for eight days the writer basked in the sun on a certain flower-strewn mountain side twelve miles behind the Front, overlooking the little French town, with its gleaming roofs and glittering lake, and its fir and pine forests sweeping off into distance on every side.

The French peasant is a model of industry. If a certain task promises to be too arduous or insufficiently remunerative to occupy the working hours, he turns to it at the dusk of a long day's work, and stone by stone, root by root, accomplishes his end during his "idle" hours. It is thus that the mountain side on which I basked was turned from a barren upland into a garden of Eden. Looking upon it at the hour of sunset, the effect is as weird as it is picturesque, for from foot to brow the mountain consists of an irregular series of little steps, which catch the light and incidentally the rain, and which are green with the tender tints of fresh vegetables. Each humble cottage has its sacred plot, and to-day, though there are only the old people and the children to tend them, not a scrap of ground stands idle. Each night I saw a very old woman toiling from her humble dwelling high up the rugged and tortuous path, carrying a bucket of water over each shoulder for the tiny plot of land three hundred feet above her dwelling—and this at the end of a day's hard toil. The vegetables these little gardens yield, within sound of the guns, amidst the battered relics of war, are marvellous, and here and there between the plots of land are hayfields, the produce of which is carried on the shoulders of the old men and women down into the lowlands, just as the water is carried up at the fall of dusk.

The Great Sacrifice.

There is something endlessly noble in this struggle of the old people of France to maintain home just as it always has been, so that when brother or son or husband returns he finds nothing missing. But how many, alas, do not return! France has bled beyond the limits of belief. One day I noticed a group of children, all probably under ten years of

Pro Patria.—

age, playing on the hillside, and on remarking, I was told that, though several different families were represented in the bunch, every child there had lost its father in the war.

It seemed hard to credit, but later I found that it was difficult to select any child under twelve years of age who could boast the possession of a father, the fact of the matter being that a man with small children is usually in his fighting prime as a soldier, and that if he did not go under early on he has had ample opportunity since.

We in England do not realise the sacrifice France has made, and the magnificent tenacity of her fighting troops in the face of such sacrifice. The tenacity of those at home is equally magnificent. I noticed one youth toiling incessantly from sunrise till sunset—loading hay, tending cattle, carrying water, digging—and wondered why he was not in uniform till one day, passing near, I saw that his left hand was missing at the wrist and he wore the Military Medal. He was the only youth I saw in civies, for in France there are no exemptions from military service for those who have arms and legs and limbs—no young men hiding behind the screen of the so-called indispensable. The young are gone, and the old are left to carry on.

Not Too Old at Forty-two.

The young! Here the man of forty-two is not too old for the trenches. He is a magnificent soldier, this old territorial, and, indeed, the backbone of the French Army. When it is necessary to stick to the guns in the face of the most appalling opposition it is the old territorial, stiffening up the young fighting troops, who does it. When it is necessary to sit for weeks in water and mud and the compound miseries of war, ever cautious, ever alert, ever ready, the old territorial is the man for the job; and, finally, when the sidecars bring out one who is wounded from head to foot, and yet who never forgets his *Monsieurs*, never murmurs, and assures you he is not suffering much, that one is an old territorial. In England we may be too old for the trenches at forty-two, but the French soldier at that age is the "old reliable" of the war.

Work—the Lotus.

Not in food and the ordinary necessities of life have the French felt the pinch of war so keenly; in this respect they are probably better off than we are, but their appalling losses have struck to the hearth of every home. It is not merely the boys who are gone—it is those who had cleared the mountain sides of their rocks and timber, who had built homes and surrounded them with flowers, and at whose tables there were many little mouths to feed. They too are gone—*Pro Patria*—leaving behind them tired-eyed women whose work was heavy enough, heaven knows, even before! Now old grandma and grandpa come tottering up from the valley to help with the hay, bringing with them, perhaps, a sadly disabled brother "to do the heavy work." But the home on the hillside remains unchanged, the garden is still green, the creeper is cut, the border is trimmed. There is only one who has changed—the woman who tends it. That is why France is weary.

A snap of "Chinook" among Yorkshire hills and dales in happier days.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

FOUR-CYLINDER ENGINE DIMENSIONS.

Sir,—In *The Motor Cycle* of September 5th you state on page 211 that if four-cylinder engines are to be made much below 1,000 c.c. it would appear that the long stroke engine will not be greatly favoured as the bore would have to be so small. I do not see that there should be any difficulty, provided that the bore is not below 50 mm. Several successful engines have been built with bores of 51 to 59 mm., and why not even smaller bores?

As the chief thing that the designer is up against is length of engine, I think that he has every reason to use a long stroke engine, especially as this type of engine has proved itself mechanically and thermodynamically superior to the short stroke engine.

Why not $51\times76=621$ for solo work or $52\times88=748$ for sidecar work? JOHN HARRISON.

PETROL FOR DISCHARGED SOLDIERS.

Sir,—My grief is intense, and a 6 h.p. A.J.S. outfit lies motionless in my shed. The Petrol Controller, however, does not pity me. I was discharged in February last from the A.S.C., M.T., and applied to him for authority to use four gallons of spirit which had been lying in the shed since I joined up. I particularly pointed out that I did not want a licence to *purchase* spirit, but the reply was: "Can't be done." It seems rather hard, after doing a matter of 250 miles per week through all the operations of 1917 between the Somme and the sea. 2ND "LOOT."

Glasgow.

PETROL FOR SOLDIERS ON LEAVE.

Sir,—Could not the taking out of taxation and driving licences be waived in such cases, at all events where unexpired licences were held prior to joining up? Surely the Government do not expect 25s. in licences to be paid for the privilege of using two gallons of petrol!

B.E.F. (PIONEER) S. G. BARNARD.

[We have already expressed our opinion that the authorities might well forego the local taxation licence, but to obtain exemption for it a special Act of Parliament would have to be passed.—ED.]

Sir,—You may be interested to know that when on leave for fourteen days in August I called at 19, Berkeley Street, filled in the necessary form completely, and obtained my permit in the course of less than ten minutes. On the second day of my leave, armed with all the necessary licences and permit, I proceeded to make the most of my vacation on a 4¼ h.p. B.S.A. combination.

I would also like to endorse the suggestion of Capt. P. A. Lewis, R.E., on the subject of soft jobs on iron steeds. We all have our tight corners out here.

Although I am in an infantry horsed transport section, there are several pre-war motor cyclists with me who eagerly await the "Blue 'Un," which turns up regularly from home.

B.E.F. GAUNTOPE.

Sir,—I cannot resist the temptation of criticising "V.P.'s" letter in your issue of August 29th. Like many others, he has no idea of the uncertainty of leave. Many have even started on leave, been called back, and perhaps finally reached Blighty six or seven months later. If leave had originally been expected for, say, August or September, and the suggestion been followed, a man would have been poorer by £1 paid on tax, and found permit book useless, as tickets would have been cancelled for the date he required them. I have usually had to remain in town overnight to obtain a permit at once, as the leave train generally arrives too late to reach 19, Berkeley Street, before they close.

Undoubtedly the best method is to call personally, if possible, as you advise, but even then they would prefer to send it on by post, anything to delay.

Your illustration and criticism of the Wanderer also interested me, as I owned one of these machines in 1914. It may be behind in some things, but is certainly ahead of our designs in several important features. What D.R.'s machine out here has even two out of the three following much-needed points: Spring frame and forks, Rudge type back stand, and internal expanding rear brake?

B.E.F. OLD READER.

DECARBONISING CYLINDERS.

Sir,—I have often read articles in your valuable paper on various methods for decarbonisation. The following is quite an old dodge, which is really the correct way. It does not, as often argued, produce chemical changes in the cylinder metal. The procedure is as follows: Mix 5 lb. of caustic soda in 3 gallons of either (cold) distilled or rain water, i.e., 5 to 30 parts by weight. Boil the cylinders in this—it must boil all the time—for at least thirty minutes, when all the carbon will be easily rubbed off. If it is possible, boil them two hours, when the metal will be quite white and clean; add water as it evaporates by boiling.

When finished, wash well in three changes of *hot* water, and dip into "A" oil. This will sound an awful job, but really is simple and most effective. It is constantly used for rotary aero engines. J. P. J. CHAPMAN.

LEAKAGE OF MAGNETISM.

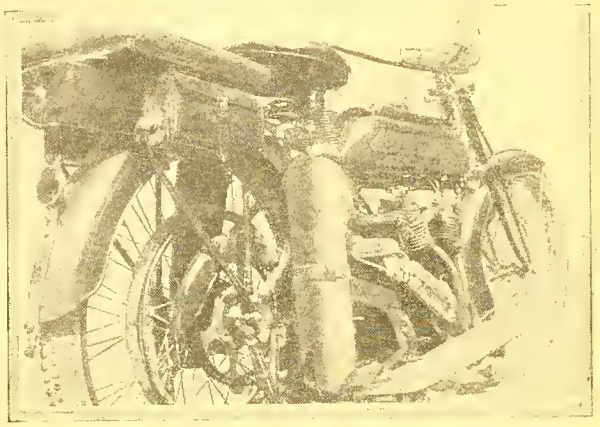
Sir,—In your issue of May 16th last there is an article from "W.A." on "Leakage of Magnetism." The next reference on the question is in copy July 11th, by "E.V.P." Now I again bring the subject out of its "hole." I have had considerable trouble with my 2¾ h.p. Douglas lately, and put this down to loss of magnetism in my "Dixie." I tried for a long, long time to get my engine to fire, but my efforts were of no avail, until I sent my magneto to the American Supplies Co., Ltd., for overhaul and repair. It turned out chiefly to be loss of magnetism, as I at first thought. To come back to the part where I am trying my engine: I got exactly the same results as "A.W.", viz., a fairly good spark from plugs when out of cylinders, but when in not even enough to cause a solitary bang. I came to the conclusion this was caused by weakness of the magneto and its inability to fire under compression. I noticed upon taking the magneto down that the sprocket wheel was inclined to stick to the shaft and it turned out that the shaft itself was magnetised. I rang up the "Dixie" people and was told that the magneto was none the worse for this magnetism being in the spindle. Now what I should like to know is whether there really is any importance attached to leakage of magnetism through sprocket wheel being made of steel, because, seeing that my magneto has just been remagnetised, I should at once obtain a brass wheel and considerably lengthen its life. I notice "E.V.P." asked if some reader-owner or one of the firms interested would enlighten us on the fact—and it would be looked forward to most eagerly—but I think that no reply has been yet forthcoming. Could not some reader or experienced person settle this question, please?

Belvedere. DISCHARGED.

RUNNING ON DISSOLVED ACETYLENE.

Sir,—With great interest I follow the motor cycle movement in your excellent paper, though since Italy declared war I am no more directly interested in the motor cycle business. As you may remember, I have been for a certain time in correspondence with you as the editor of the *Motociclismo*, in Milano, of which I hope to be able to continue the publishing after the war is over.

Enclosed you will find a photograph of my Motosacoche which is running on dissolved acetylene. Two flasks of dissolved acetylene are clearly to be seen fixed on the back forks of the cycle. The gas is conducted through brass pipes to a patent distributer, and from there directly to the con junction of the carburetter and the inlet pipes of the engine. For starting purpose I keep a small quantity of petrol in the tank (joy-riding with petrol is not allowed in Switzerland), and after about a hundred yards I open the gas tap on the flasks, and the engine continues to run on gas.



A motor cycle equipped to run on acetylene.

Each flask contains enough gas for about thirty-five miles, and the changing of an empty flask takes not more than five minutes. The cost of running the engine on acetylene gas is about 7½ centimes a mile.

Basle. H. VAN DER SCHALK.

BRITISH AND AMERICAN MACHINES.

Sir,—I see "Chinook" in his reply to the Rev. A. M. Walmsley makes veiled apologies for his biased article, written, as he says, in his giddy youth (January, 1918).

If "Chinook's" rejoinder to my article on the mechanical points of the machines under discussion was, as he says, his best efforts as a soother, I can assure him he failed ingloriously. He comes back to points again such as twist grip control, 28×3 wheels, big clearances, and other details, and mentions that he "knows of British spring frames every bit as good as the best Americans, *but* the makers have not decided to fit them yet," etc. When we consider how long the Americans have made a successful spring frame I think we may count "Chinook's" knowledge of these mystic spring frames to be the best answer to himself. Also the *one* solitary instance of mechanical oiling answers him in the same way, as he can instance but one make out of dozens, on a successful point fitted generally to American machines.

True, big ground clearances and 28in. wheels are fitted to some "military models," but only recently, and we must not forget that the public have had the benefit and comfort for years on American machines of a point which it took a "world war" to prove to us was a necessity.

"Chinook's" articles on sidecar driving with the Red Cross are really fine, and I always read them with great interest, yet I think he would be well advised to stick to that style or start writing novels, where his powers of "gross exaggeration" would be used to some purpose.

As to "Chinook" standing in "No Man's Land" with a candle in his hair (and he says he is serious) rather than work in an American repair shop, well, it goes to prove again that his experience with American machines is very shallow, and I can only assure him that if I could transfer to work on American cycles I would do so at once. If "Chinook" will look up his "giddy youth" article, and then his rejoinder to mine, perhaps he will try and tackle it again from a truly mechanical standpoint, and for once leave out any nonsense about "sixty splint pins," or "shaking to pieces until permanently rusted to frame," etc. Surely he has not forgotten these phrases.

I am very sorry to have to butt in again and use your space, but really I do think that some of "Chinook's" statements ought not to go unchallenged, and I hope you may find room for this, otherwise "Chinook" will appear to have it all his own way. BERT HOULDING.

Sir,—While reading *The Motor Cycle* of September 5th I was rather taken aback by the letter from our old friend and playmate "Chinook" *re* the Rev. A. M. Walmsley's wants and likings with regard to American motor cycles.

I am a member of that section of the motor cycling community which regards "Chinook" as a leading man among the No. 9 hats, and when he starts to be feebly sarcastic about those most excellent features of the American motor bicycle which the Rev. A. M. Walmsley mentions in his letter, I feel that he must have been thinking about something in connection with the Food Control, or someone's patent electric crane for unloading railway trucks, for I cannot see otherwise where he gets his ideas that the American designer is such a juggins as he would make one believe

What motor cyclists need is a machine which will give them the greatest amount of service and pleasure (hush!) for their money and particular taste; and I think that I am correct in saying that a man who wants a machine to last for ever, and to incorporate an oil pump which will pump for ever, also other parts which will function likewise, is doomed to a bitter disappointment; but among commonsense persons such an individual does not exist, hence the reason that American designers and builders do not make frantic efforts to produce a machine which possesses these properties, but give their clients a good, comfortable, reliable, and easily controlled 'bus, which is of far more value to those keen on efficiency in their mounts than the British ideal which lacks the useful spring frame, oil pump, and silent timing gear of the American, not to speak of the nice, large tyres and real spring forks which are to be found on that machine. The reasons for these desirable features being absent are because the highly reputable British manufacturer is unable to develop them to the uncalled for pitch of perfection which our friend "Chinook" advises.

I know a certain British aero engine of large size and large horse-power which is built and finished with such a wealth of beautiful workmanship and highly developed design that its American brother of similar type and horse-power is rendered a thing of ugliness, although the flying life of the two engines is the same, and the British motor cannot do a single thing that the American will not do. So what is the use of all this talk of British "thoroughness" if, when you have finished, you have not made some real, live improvement which will give results greatly in advance of the sneered-at designs of the American, and really make the nasty uncomfortable British 'bus of to-day a thing worth riding; for how can we compare the typical Britisher with its small tyres, splash lubrication, miserable tap-twiddling controls, and valve-clattering engine with, for instance, the beautiful and silent Harley, or the 1918 Reading Standard, with power and efficiency in every line? The latest figures regarding petrol consumption of these big twins, viz., averaging well over 90 m.p.g. in an official trial in the States, show that, when properly handled and driven with intelligence, these machines will give results which put them in the front rank of the mechanical horses on which we modern cavaliers career about the poor, long-suffering earth.

JOHN G GRENFELL.

ONE-LEVER CARBURETTERS.

Sir,—Referring to a letter signed James Reece, I would like to point out that the old two-jet Binks carburetter, as made four or five years ago, is on an entirely different principle from the carburetters which I have been manufacturing for the last three or four years. The old two-jet carburetter was not as automatic as the present one, as the choke tubes were not variable. The present three-jet carburetters are so automatic that, when correctly set, the machine will ease up, if extra air is given, at any speed.

C. BINKS.

ONE-LEVER CARBURETTERS.

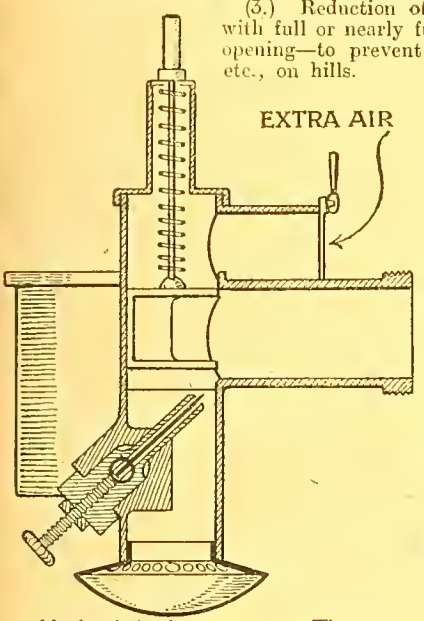
Sir,—I read in *The Motor Cycle* that Tilston Engines, Ltd., are on the look out for a new type of one-lever carburetter.

I have had the enclosed sketches by me some months, and on looking them up I still think that, by careful experiment, an efficient and cheap carburetter could be made on the lines indicated. The idea was to reproduce with one piston or slide and one operating lever the conditions which obtain with a two-lever carburetter. These conditions may be roughly stated as—

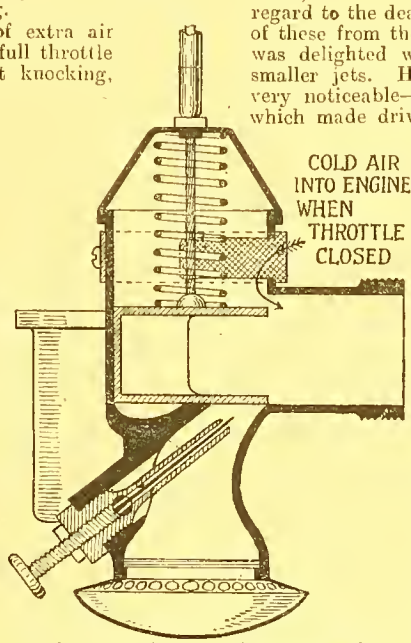
(1.) Extra air closed for starting.

(2.) Admission of extra air simultaneously (and in proper proportions) with further throttle opening.

(3.) Reduction of extra air with full or nearly full throttle opening—to prevent knocking, etc., on hills.



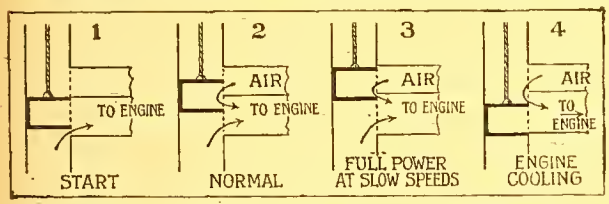
No. 1.—A simple arrangement. The extra air may be adjusted during test by means of shutter provided.



No. 2.—A choke tube is incorporated in casting. The extra air is provided with an adjusting arrangement and a gauze.

At the same time, a simple and easily constructed carburetter with adjustable and accessible jet was aimed at; also provision was made for air only to be drawn into the engine when the throttle was completely closed, thus enabling one to cool the engine when a suitable opportunity occurred.

As Messrs. Tilston Engines, Ltd., have made their appeal through your columns, I am taking the liberty of submitting



No. 3.—The action of the carburetter for various positions of the throttle.

the sketches through you, should you consider them worth it. I have no time for experimenting at present, and therefore cannot say what the suggested carburetter will do in practice.

C. R. EASTWOOD.

THE THREE-JET BINKS CARBURETTER.

Sir,—I have used three of the above for ten months on five Douglas 2¾ h.p. two-speed flat twins. The following points in which my experience differs from that of Dr. Alexander Lindsay, M.B., the writer of your interesting article, may be worth recording:

1. If the jets are right, there is no dead spot in the carburetter at any phase.

2. The band clip on bottom air holes affects the mixture only when opening on to the main jet; its effect is quite noticeable. Leave it shut, and you get a rich mixture on opening on to main, and a weak one on full throttle; open it, and you get the same mixture all through.

3. If Dr. Lindsay must waggle two levers, why use a Binks anyway?

I find that weather conditions have a great effect on this carburetter. This is worse on a flat twin, with its long induction pipe, than it would be on a single or V twin. In spite of this, the Binks is well worth while for the speed, acceleration, and slow running that it gives. F.S.R.

B.E.F.

Sir,—I have been very interested to read the letters with regard to the dead spot in the Binks carburetter. I bought one of these from the firm to fix on a 1915 8 h.p. Matchless, and was delighted with the economy and slow running on the smaller jets. However, the dead spot on the big jet was very noticeable—in fact, with that jet it was all or none, which made driving awkward. I removed it partly because of that, but principally because I found it quite unsuited for the particular machine. Messrs. Binks supplied me with a special adapting arm, but this had the effect of sticking the carburetter out beyond the cylinders, where it caught all the draught. I tried various ways of muffling it, but found it impossible. I think it should never have been sold to me for the Matchless, as I do not consider it possible to fit it satisfactorily.

I have saved the carburetter, hoping to fit it to some other machine, as I was really charmed with the slow running it gave. I could stroll beside the machine with both cylinders ticking regularly.

DOUGLAS W. GROVER.

COST.

Sir,—In recent numbers of *The Motor Cycle* there have been comments on the cost of the present-day machines. To my mind, they are rather costly for the man of ordinary means. Is it not possible to put on the market a cheaper machine, say with less finish and of a simple design? It is possible in a motor car, so why not in a motor cycle? Take the Ford car, for instance. It is very reliable, serviceable, and yet cheap. Its working parts are few compared with other makes, and therefore very simple in design. This has great advantages. It lessens wear and tear, and consequently your upkeep is not so great. Then, again, is it not more satisfactory to the novice who knows nothing about his machine apart from what he can see? He does not want any fine adjustments which tend to make a machine complicated. Such things often cause trouble on the road, not because they are of no use, but because of the driver's inability to understand them and keep them in proper working order.

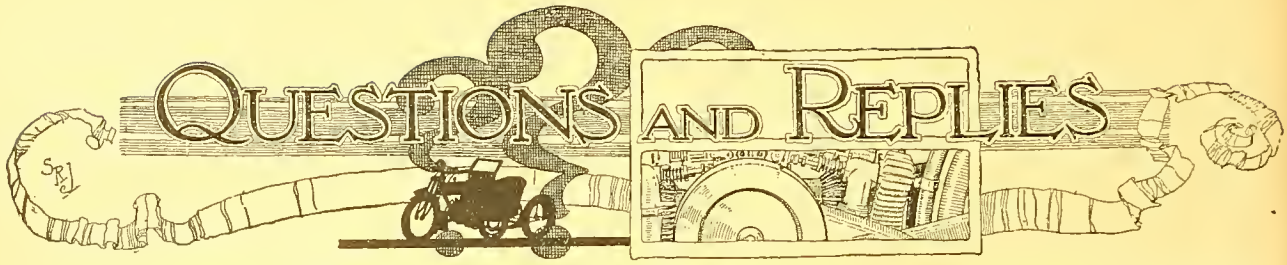
Now, could not a machine be designed so that adjustment is unnecessary? One big fault in some machines is the lubrication. Strictly speaking, there is not a single machine that gets perfect lubrication. The feed is so irregular. It is so easy to give the engine too much or not enough. If it be a twin-cylinder engine, one cylinder gets more than the other, and so on. The whole arrangement is so uncertain and incomprehensible in the case of the beginner, and often causes trouble when not understood. Still, at the same time, it is quite satisfactory to the engineer or the expert.

Another little point that is often noticeable is the amount of nickel finish on a machine. It looks well, of course, but is it all necessary? Unless the plating is thick, which would be costly, it easily rusts, and looks bad. Would not enamel serve the purpose in many cases? It is very much cheaper, and as serviceable as nickel, besides being more easily renewed. This sort of thing increases cost, and in many cases is not advantageous.

I think these points are worth considering, as many a man is deprived of these pleasures in life just because of its high cost. Why not try to share our enjoyment with others?

KIWI.

N.Z., France.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Which is Number One Cylinder?

There have been several arguments as to the correct numbering of the cylinders on a late 1915 7-9 h.p. Indian I possess. What we desire to find out is which cylinder is No. 1—the front or the rear?—W.P.

Usually in motor cycle practice the rear cylinder is No. 1.

Difficult Starting.

A few weeks ago I bought a second-hand N.S.U. motor bicycle. It is fitted with a low-tension magneto and a three-jet carburetter. It is very difficult to start, and runs for about a minute and then stops. Do you think that a high-tension magneto would improve it and make it start more easily, or would you advise me to have the low-tension magneto overhauled?—C.W.

The magneto in question should be quite all right unless the magnets require re-magnetising. The trouble is more likely to be due to the carburetter, and we should recommend you to write to the makers of it on the subject.

An Exhaust Throttle.

I have a 3 h.p. Fafnir motor cycle with automatic inlet valve, which is fitted with two exhaust lifters, one of which is attached to the exhaust valve tappet and is lifted by means of a Bowden wire on the handle-bar, and the other works in the timing gear. I have never used this one since I have had the machine. Is there no connection to the small lever which projects through the timing gear cover? This small lever was once moved, and the engine ceased to fire. Could you tell me how this thing works?—W.J.P.

You are wrong in supposing that your motor cycle engine is fitted with two exhaust lifters. This is not the case; one is a true exhaust lifter, while the other is a lever on the timing gear case, which controls a wedge inserted between the exhaust cam and the bottom of the exhaust valve tappet. As the lever is worked round it draws this wedge back and prevents the cam from lifting the valve to its fullest extent. It is therefore not an exhaust lifter, but an exhaust throttle, and by this means the engine is controlled by throttling the escape of the gases, which is not a very good practice, and in later models was replaced by a variable inlet valve worked on the same principle.

A Motor Cycle for Business.

Would you kindly inform me if I am liable to pay the £1 local taxation licence for using my motor cycle and sidecar for business purposes? My name and address are painted on it.—W.D.

You will have to pay the local taxation licence for the machine unless it is constructed and adapted solely for the transport of goods and merchandise—that is to say, it must be fitted with a proper box carrier, which is never removed, and your name and address painted thereon in one inch letters. Also, one of the bolts by means of which the motor bicycle is attached to the sidecarrier must have a steel pin driven through it and the nut.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

Soldering Bowden Wires.

(1.) The Bowden wires, or some of them, controlling my carburetter, are broken in the handle control clips. I have tried soldering without success, as I get them too large to work around the clip when soldered. (2.) Can I lengthen the wires at the carburetter? About 1in. is all I should require. It is a B. and B. carburetter. (3.) Which is the proper way to solder Bowden wires?—A.P.

(1.) It is rather difficult to answer your question without actually seeing the machine. There is no great difficulty about soldering Bowden wires; it only needs practice and a knowledge of how to proceed. (2.) The wires cannot well be lengthened, but the outer casings may be shortened, and this may answer the same purpose. (3.) The proper way to solder a Bowden wire is to tin the end. See that the end is quite clean, dip it in flux, and then rub the iron round it; file or scrape off any excess of solder. If you then have to attach a nipple to the end slip this over the wire, heat it well in the gas flame, and put a blob of solder on the top. It will then be quite secure.

The Petroil System.

I wish to convert the drip feed lubrication of my 2¼ h.p. Levis to the petroil system of lubrication. (1.) What alterations (if any) shall I have to effect? (2.) Is the petroil system harmful to the bearings in any way?—D.M.

(1.) Simply cease to lubricate through the drip feed lubricator, and add oil in proportion of half a pint to one gallon of petrol. (2.) The petroil system is by no means harmful to the bearings, but exceedingly harmful to the rider's clothes, as everything gets covered with a film of oil.

READERS' REPLIES.

Removing a Pulley.

With reference to your answer to a correspondent enquiring as to the best method of removing a Triumph adjustable pulley in "Questions and Replies" of September 12th, I would like to suggest a more usual method of so doing. Unscrew the cap and slack back nut on engine shaft two or three threads. Place a metal disc against nut on engine shaft, screw on cap again fully, and, with a pulley spanner placed on cap, give it one or two smart taps with a hammer, and it will leave the shaft easily.—TURBINE.

Bluing Soldered Metal.

I see in your issue of August 29th a correspondent asking for a process for bluing steel without the employment of heat. First clean the steel and then apply the following liquid: Alcohol, 30 grammes; nitric acid, 15 grammes; sulphate of copper, 10 grammes; water, 125 grammes. When the steel is dry the surface should be polished with a soft woollen rag.—HENRY BOURSIAC (Cherbourg).

RECOMMENDED ROUTES.

WHALEYBRIDGE TO CAERPHILLY, VIA DERBY AND WARWICK.—W.H.G.

Whaleybridge, Chapel-en-le-Frith, Baslow, Matlock, Derby, Ashby-de-la-Zouch, Ibstock, Hinckley, Coventry, Warwick, Stratford-on-Avon, Broadway, Winchcombe, Cheltenham, Gloucester, Lydney, Chepstow, Newport, Caerphilly.

MANCHESTER TO LOWESTOFT.—C.W.W.

Manchester, Stockport, Chapel-en-le-Frith, Baslow, Chesterfield, Mansfield, Newark, Leadenham, Sleaford, Swineshead, Fosdyke, Holbeach, Long Sutton, King's Lynn, Swaffham, Dereham, Norwich, Beccles, Lowestoft.

Sports Model.

Our "Post War" programme comprises two types of machine—the light "SPORTS" model, direct belt drive with variable pulley, and the "UTILITY" model, countershaft gear and all chain cush drive. Both models—3½ h.p. and Big Four—fitted with the NORTON long stroke single-cylinder engine, a type accepted by engineers as the most thermally and mechanically efficient engine made, and **Proved Perfect in Practice.**

The Ministry are taking the whole of our present output, but we have a waiting list.

Utility Model.

THE UNAPPROACHABLE NORTON THE UNAPPROACHABLE

NORTON MOTORS, LTD., ASTON, BIRMINGHAM.

Write for the book of the Single.

BARTLETT & CO., GT. PORTLAND ST., LONDON.

DIAMOND MOTOR CYCLES

AT THEIR INCEPTION Became the pioneer of many improvements in Motor Cycle construction, which were largely commented upon and copied.

POST-WAR MODEL. Scientific design and construction based on advanced engineering principles will make this machine even more popular than its predecessor, and will add to the reputation of

THE RELIABLE MACHINE.

Telegrams: "Diamond, Wolverhampton." A.B.C. Code 5th Edition.

The D. F. & M. Engineering Co., Ltd., — Vane Street, — WOLVERHAMPTON

Bluemels

"Motobike" Pumps Sparking Plugs and Accumulators have been made the best by continually trying to make them better.

BLUEMEL BROS., LTD.,

WOLSTON Nr. COVENTRY

BELDAM RETREADS

"Speaking from Experience."

"You retreaded a tyre for me about a year ago with your medium tread. It has been running continuously on the front wheel of my combination, has done 2,500 miles, and has not punctured. This, in my opinion, is a guarantee of your work and my appreciation."
P. V. B. (Portsmouth.)

're Beldam retread I had over twelve months ago, I am more than satisfied with it. I have used it practically every day, in all weathers, hail, rain, or snow, and, by the look of it now, I shall get a lot more mileage from it."
C. H. J. (Northants.)

"I am forwarding a 26 x 2¼in. tyre for retreading, and may state that I have had tyres retreaded by you, and have found them equal to a new tyre in wear."
B. H B. (Bedford.)

Beldam Motor Cycle Tyre All-Rubber Retreads cost from 13/- to 17/6; patching and bursts according to requirements.

The Beldam Tyre Co., Ltd.,
Brentford - - - - Middlesex.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

A.B.C. Special Isle of Man Racer, 3-speed countershaft gear, Claudel carburetter, with warm air intake, extra large tanks, with quick-filler caps, powerful band brake operated by pedals on either side of machine, special exhaust pipes, Bowden extra air valve, capable of very high speeds and terrific acceleration; it has been very little used, and is in perfect mechanical condition.—Seen at Maudes', 100, Gt. Portland St., W. [X8114

A.J.S.

A.J.S. 6h.p. Combination; immediate delivery.—Parker's, Bradshawgate, Bolton. [X8202

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

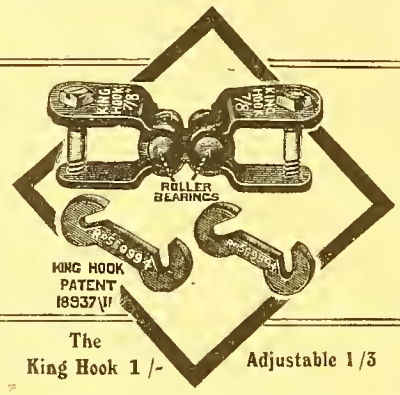
A.J.S. Combination, 1917, Lucas dynamo lighting and horn, spare wheel, superb turnout; £120.—51, Maplethorpe Rd., Thornton Heath. [8336

A.J.S. 6h.p. Combination, 1914, in good order, Binks, lamps, 3-speed; £60, near offer, or take light solo part exchange; appointment.—King, 82, Bunhill Row, E.C.1. [8269

MILITARY Model 6h.p. A.J.S. Combination, 700×80 tyres, spare wheel, accumulator electric light set, new November, 1917; what offers?—Gerry, Pharmacist, Devizes. (D) [8244

A.J.S., 2¾h.p., 3-speed countershaft, excellent condition, speedometer, lamp, etc., £42; 2-speed ditto, £35; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [8443

Forward Facts No. 8



The King Hook 1/- Adjustable 1/3

You want a fastener that never fails; that will give you uninterrupted service, that you can rely on to "hold" under all circumstances; that will afford you a sense of safety by providing you with Belt security. In short you want a

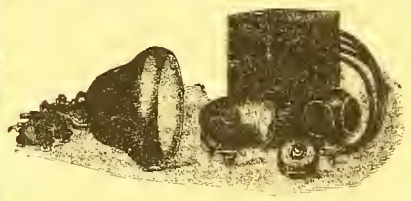
FORWARD

THE FASTENER THAT NEVER FAILS.

FORWARD MOTOR Co.,
Forward Works, Summer Row,
BIRMINGHAM.

1706

F.R.S. ELECTRIC



Sidecar sets, complete, as above 153/-
Motor Cycle sets, with accumulator in box, for fitting to top tube .. 100/-
Lamps only, with handlebar fittings 45/6

F.R.S. LAMPS, "Beam" Works, Pershore Street, BIRMINGHAM.

ROSCO CYLINDER BLACK.

PRESERVES YOUR CYLINDERS.

Tins, 6d. Tins, 1/- Withstands Heat. Post Free, 8½d. Post Free, 1/3½

Sole Manufacturers:

OWEN BROS., HULL, Eng.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S., 6h.p., and sidecar, with luggage grid, ru 3,190 miles, nearly new condition, Lucas lamp and horn, Cowey speedometer; £75, or nearest offer owner joined up.—Richardson, Newland, Northampton [X660

6h.p. A.J.S., 1915 model, dynamo lighting, 3-speed countershaft gear, handle-bar controlled clutch, all chain transmission, De Luxe coachbuilt sidecar, detachable wheels, special good engine 90 gns.—Wauchope's, 9, Shoe Lane, Fleet St., London [840

A.J.S. Spares; prompt delivery. — Cyril Wilbam Chapel Ash Depot, Wolverhampton. [49

Alldays.

RIDER TROWARD and Co., 31, High St., Hamp stead.—Allon, 1916, 2-speed, 2-stroke; 27 gns. [834

ALLON, 2¾h.p., 2-speed, perfect, speedometer, etc. run 1,900 miles.—Norvic, South Heath, Great Missenden. [8234

ALLON, 2¾h.p., 1915 (Aug.), splendid condition latest rear brake, 2½in. back tyre, petrol or paraffin; nearest £20.—Stokes, Manor Farm, N. Cray, near Sidcup. [823

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8436

Antoine.

3½h.p. Antoine, drop frame, Bosch, Xl'all, semi-T.T. bars, needs assembling; £8/10 or nearest, exchange cycle.—Brookes, 90, Burton Rd., Lincoln. [X8207

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

Bown.

1915 2¾h.p. Bown-Villiers, Stewart horn, lamps, new tyres, just overhauled; £17.—61, Peckham Park Rd., S.E. [8331

Bradbury.

BRADBURY, 1913-14, 4h.p., mag., F.E., clutch, new tyres; gift, £19/19.—143, Ravensbury Rd., Earlsfield. [8344

RIDER TROWARD and Co., 31, High St., Hampstead.—Bradbury, 1913, 4h.p., 2-speed, re-enamelled and replated, 29 gns.; Bradbury, 1914, 4h.p., 3-speed, coach sidecar, 35 gns.; Bradbury, 1912, 3½h.p., 2-speed, 19 gns. [8348

B.S.A.

B.S.A. 3½h.p. 1914 Motor Cycle, in splendid condition; £26.—Central Motor Garage, Worcester. [X8082

RIDER TROWARD and Co., 31, High St., Hampstead.—B.S.A., 1913, 3½h.p., 2-speed, clutch, pedal start; 29 gns. [8349

1916 B.S.A., 4¼h.p., 3-speed gear box combination, Dixie mag., fully equipped; £60; exchange entertained.—185, Brighton Rd., South Croydon. [X8175

B.S.A. Late 1915 Coachbuilt Combination, all enclosed chain drive, countershaft 3-speed gear box, kick starter, all accessories, splendid condition; accept £46 cash for quick sale.—24, Grosvenor Av., East Sheen, S.W.14. [8308

B.S.A. Combination, 3½h.p., 2-speed, most magnificent machine, fitted up regardless of cost, equipment includes Smith speedometer, lamps and generators, tools, luggage carrier, spares, etc., perfect throughout, 90 m.p.g.; great sacrifice, 50 gns.; would exchange for higher-powered machine with cash adjustment; seen any time.—G., 4, Temple Rd., Cricklewood. [8265

1916 B.S.A. 4¼h.p. Combination, 3-speed countershaft, kick start, chain drive, Lucas head, separate generator, rear light, horn, Brookes, Palmer cord tyres cycle, Dunlop sidecar, good kit tools, little used on account of petrol restrictions, recently been overhauled, Mills-Fulford sidecar; no dealers; £70, real bargain.—Box 2,276, c/o *The Motor Cycle*. [X8117

LATE 1915 B.S.A., 4¼h.p. Model K., Mead-Deakin canoelet sidecar, with storm apron, 3-speed countershaft gear, kick starter, accumulator lighted (or acetylene), Palmer tyres, 3in. back, spring pillion seat, Stewart horn, Cowey speedometer, auxiliary tank, good set of overalls, spare belt, plug, valve, usual tools, laid up last 12 months; outfit complete £55, no offers.—H.S., 138, Hainault Rd., Leytonstone, E.11. [X8081

Calthorpe.

1916 Calthorpe-Jap, 2¾h.p., 2-speed Enfield gear; £27/10.—Wauchope's, 9, Shoe Lane, London. [8406

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

1915 Calthorpe-Jap, 2¾h.p., nearly new, fitted two good Moseley covers; first offer secures.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

Advertising and Publishing Offices:
20, Tudor Street, London, E.C.4.
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Hertford Street, Coventry.
Telegrams: "Motorcycle, Coventry."
Telephone: 10 Coventry (five lines).

Northern Offices:
199, Deansgate, Manchester.
Telegrams: "Iliffe, Manchester."
Telephone: 620 City.

Subscription Rates: Home, 15s. 2d.; all countries abroad, 19s. 6d. per annum.
The Foreign rates quoted above apply also to men in the Services abroad.

COLONIAL AND FOREIGN AGENTS:
UNITED STATES—The International News Agency, New York. CANADA—Toronto News Co., Ltd., Toronto; Montreal News Co., Ltd., Montreal; Winnipeg News Co., Winnipeg; British Columbia News Co., Vancouver; Gordon & Gotch, Ltd., 132, Bay Street, Toronto.
AUSTRALIA—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
NEW ZEALAND—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin. INDIA—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta
SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

The Keeping of Motor Cycles.

THE following somewhat alarming paragraph appeared in *The Times* of Saturday last:

> "Regulation 9 AA of the Defence of the Realm Regulations has been amended to empower the competent naval or military authority to make orders prohibiting or restricting the having, keeping, or using of a motor cycle by any person other than a member of His Majesty's Forces or a police constable, without a permit from the competent naval or military authority, or from the chief officer of the police in the district in which the person resides. The competent naval or military authority is given power to enter and search premises if he suspects that a motor cycle is kept there in contravention of any Order made under this regulation, and to seize any motor cycles so found."

While we do not pretend to know exactly what the authorities have in mind we are of opinion that those motor cyclists who are using their machines strictly in accordance with the petrol regulations will have nothing to fear. It is, we are afraid, a fact that many motor cycles are used for purposes which do not comply, either in the letter or the spirit, with the petrol restrictions, and by riders who have not the necessary permits, or, if they have, interpret them in a manner which, using a very mild term, can be described as somewhat elastic. It is impossible for the police to bring all these offenders to justice, as they cannot obtain a conviction—and quite rightly—upon mere hearsay evidence. It is possible that the new regulation has been introduced to deal with such cases as these, for it empowers the competent naval or military authority to search for and seize any motor cycle. It will, therefore, in the future not be necessary to catch the offenders red-handed.

Another explanation may be that the authorities desire to have knowledge of a certain number of motor cycles which may be available in case of need, but we can assure our readers that they need not worry themselves for the time being, and we assume that the naval and military authorities are taking these powers betimes, so that they can use them for the national advantage should an emergency arise.

The Petrol Controller's Department.

WE must confess that of late we have not been favourably impressed by the methods of the Petrol Controller's Department in issuing permits for petrol to various applicants. The most serious complaints which have reached us, as our Correspondence columns show, are those concerning petrol issued to soldiers on leave.

Then we must call our readers' attention to the first letter in the "Question and Replies" column in the issue of August 29th, in which a reader, having a permit to use his motor bicycle and sidecar in his business, and desiring to employ a girl to drive for him, asked if he might teach her on the petrol allotted to him. To make quite sure before sending our reply, we rang up the Petrol Controller's Department, and obtained the opinion that petrol might be used for the purpose of teaching a girl driver whom our reader intended to employ. Shortly afterwards we heard from the latter that he had been stopped by the police in Birmingham and had been warned that he would be summoned. We then rang up the Petrol Controller's Department again, and told them what had happened, and they replied to the effect that it is left to the police to interpret the regulations.

Lastly, we come to the much-discussed question of the issuing of petrol to munition workers. The munition workers may have a right to the concession, but the Petrol Controller's Department has quite failed to show why the munition workers are more deserving than many others—*e.g.*, officers and men of the Mercantile Marine and discharged soldiers.

An index to the advertisements in this issue will be found on the page facing the back cover

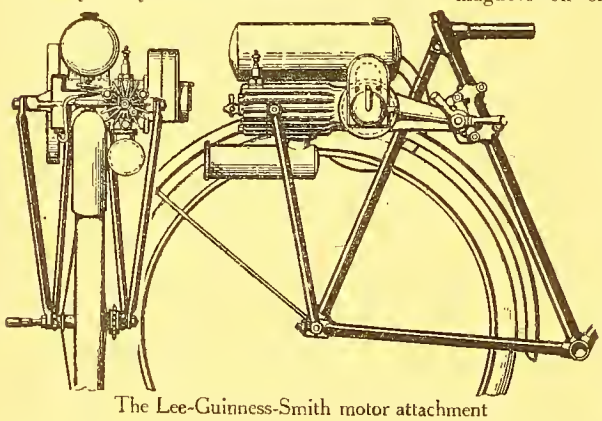
TWO MORE MOTORISED BICYCLES.

Two Inventions from the Patent Files revealing the Great Interest of Inventors in the Auxiliary Motor Attachment.

IN our issue for August 15th we illustrated types of the motorised bicycle. We are now able to illustrate two recent patents of similar auxiliary motors.

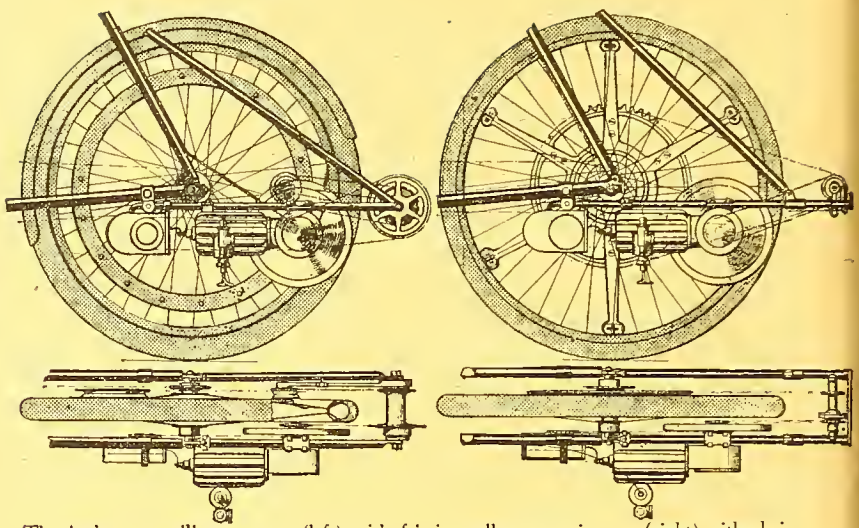
The first of these is the invention of Messrs. Lee-Guinness and C. M. Smith. The former name is very familiar to those who followed the car racing in pre-war days.

From the illustration it will be seen that this attachment is designed to drive the bicycle by frictional contact with the rear wheel, the mudguard being divided to allow of this. The engine shown in the drawing is a simply constructed two-stroke with crank case and direct-driven magneto on one side of the wheel and the flywheel on the other. Over the tyre is a friction pulley which is brought into contact with the tyre by an adjusting device at the front end of the attachment, where it is connected to the frame of the cycle. When not required the motor is raised slightly, so that the tyre and pulley are not in contact.



The Lee-Guinness-Smith motor attachment

Apparently this attachment could be made very compact; but, personally, we do not advocate driving through the tyre in this way. For one reason we think the tyre wear would be abnormal, and in wet weather the contact would be impaired.



The Anderson auxiliary motor—(left) with friction roller transmission; (right) with chain transmission. Note the position of the magneto.

The second design is the patent of a Mr. D. Anderson, and is more complicated. The power unit is carried on a frame which is attached to the back forks of the bicycle and supported by diagonal members in tension, presumably, from the seat-pillar bolt. The power unit is carried on one side of the machine in a horizontal position and drives a countershaft at the rear of the bicycle wheel by means of a chain.

Alternative final transmissions are shown in the drawings. In the first drawing a friction roller engages the inner face of a "belt" rim. This roller is driven by a chain from the countershaft. The alternative method, shown in the second drawing, appears to be more "mechanical." In this a chain is used, and we think it would find greater favour among potential buyers of this class of machine.

Some Notes on the French Tanks.

WE have to thank our contemporary *L'Auto* for some information concerning the French tanks, which have done such important work not only in the defence against the German attacks in the early part of the year, but also in the recent successful Allied offensives.

The first French tanks which appeared on the field of battle were built by Schneider, le Creusot, les Forges et Aciéries de la Marine, and the Saint-Chamond works, each being called after the factory whence it had its birth.

The French name for tank is *Char d'Assaut* ("attacking car"). The Schneider type is armed with two machine guns and a 75 mm. gun, and carries a crew of six men. The Saint-Chamond model is armed with a 75 mm. Saint-Chamond gun and four machine guns, and carries a crew of nine men. The first-named is driven by an internal combustion engine, while the second named has what seems to be a petrol-electric installation. These two models preceded by one year the appearance of the small Renault light tank—"Whippets," as we call them in the British Army. The two models referred to took part in the fights of April 16th, 1917, and after and during the autumn and the big attacks and counter attacks this year, and have given excellent results. The Renault Whippet did not appear on the field of battle until about two months ago, and immediately made good. It was an armoured vehicle equipped with a machine gun and a 37 mm. gun. It is capable of movement over very rough ground, as, for example, over a battlefield intersected by trenches and dotted with shell holes. Like its elder brothers, it is propelled on the caterpillar system. The crew consists of two men—the driver situated in front, and the gunner who is seated or stands in a turret situated in the middle of the vehicle. The engine room is protected from the rest of the vehicle so as to lessen the risk of fire. The French Whippet can climb exceptionally formidable gradients, worse than 45°, according to the condition of the surface, and the turret can revolve in a complete circle, so the machine gun, or gun, can sweep the whole horizon. The armour plating ensures the protection of both the men and mechanism against rifle and machine gun bullets and shell bursts. The total length is about six metres and the breadth about two metres.

These are the principal characteristics of the French tanks. Our contemporary goes on to say "that the German tank is a bad copy of the English model," and, naturally, our enemies have made something "kolossal." Their rolling fortresses weigh 35 tons, are driven by two engines of 100 h.p., and their crew consists of eighteen men. The armament consists of two machine guns and a 57 mm. gun in front and four machine guns at the rear. Their weight and dimensions render them difficult to manœuvre, and there is much too little road clearance to admit of easy movement.

Exhaust Flames and their Meaning.

I WONDER how many readers test their carburetter timing by running their engines in the dark with the exhaust pipe removed. According to an eminent authority, an excess of petrol in the mixture is indicated by long blue exhaust flames: flickering blue flames, alternately appearing and disappearing, indicate gross excess, whilst a black, smoky exhaust is a sure sign of ridiculous richness. On the other hand, short, red flames characterise a weak mixture. The professor omits to inform us of the symptoms of a perfect mixture, but I personally always suppose that a reddish flame tailing off into bluishness is healthy. With a multi-cylinder engine, a contrast between the several exhaust flames assists the operator to obtain level timing, and tells if the compressions are unequal or the distribution bad.

Rich and Weak Mixture.

THE same expert remarks that a very rich mixture does not result in a decreased power output or in any loss of r.p.m., unless the excess of petrol is so pronounced as to cause a blackish exhaust: its sole penalty is waste of fuel. On the other hand, the slightest "leanness" of the mixture, as the Americans term it, produces overheating, pulls down the revs., tempts the sparking plugs to get "fresh," and punishes the valves.

The Gate Change.

SOME Sherlock Holmes amongst our readers will probably deduce that I am over military age if I venture to question whether the proudly advertised "gate change" is quite the thing for a motor bicycle. A gate change of any sort calls for certain rectangular movements of the lever. It is possible that with the "one machine" type of rider such a movement eventually becomes automatic, and a perfect change can be executed under the most difficult circumstances—*e.g.*, when changing up from third to fourth at 50 m.p.h. on a roughish road. As I normally keep a mixed stud, I seldom develop centaur-like relations with any one machine, unlike some riders who from prolonged acquaintance with a single engine always know instanter what is the matter with it, just as I know which of my toes the fat tube strap-hanger stepped on. At any rate, for a man who mixes his mounts, the gate change is never ideal, and is apt to be positively dangerous when applied to a four-speed mount. Yet some designers are fitting such changes to gear boxes which necessitate the consecutive engagement of two pairs of dogs when one of their ratios is used. Mr. G. E. Bradshaw fits a gate change to his tourist machines, but a foot-operated two-speed to his road-burners. I personally consider that the rectangular movement is a blot on a fast machine, and particularly so on a four-speeder: its awkwardness is less objectionable on three-speeders when the last gear change before a speed burst occurs on second gear at a fairly modest road speed. Let it be understood that the scrapster wants a gear which can be changed by a lightning dab of the hand, eyes being kept strictly front all the time, and the wildly wobbling bar being gripped steadily by two hands except for a millionth of a second. I know scrapsters do not compose the majority of the buyers, but the man who is not a scrapster is usually a shade ham-handed, and needs a similar change for quite different reasons.

Radial and Rotary Engines.

I MARVEL that apparently sane engineers of some standing continue to talk as if the rotary engine had any future in road work. I suggest that it enjoys a purely temporary vogue on aircraft merely because the draught of its rotation is tiding the air-cooled engine over a period in which the air-cooling of a stationary engine proved just beyond men's reach. Prior to the war it was possible to air-cool a stationary motor cycle engine fairly efficiently: after the war, this possibility will indubitably extend to much bigger engines. As compared with the static radial, the rotary radial is grossly extravagant in fuel and oil, unclean, difficult to silence, and wastes a large percentage of its horse-power in overcoming air resistances of its own creation. The static radial can claim, I think, every conceivable merit expressed or latent in the rotary, and is free from the above defects. In other words, if we ever dispose innumerable cylinders starwise round a central crank case, the static radial has the rotary-radial "beat to the wide" for road work.

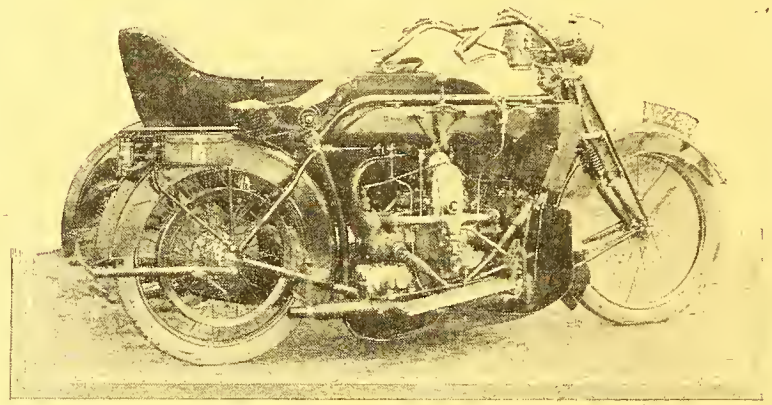
The Girl's Solo Mount.

AS far as I can gather, the average girl rider regards a 2 cwt. 500 c.c. machine much as a middle-aged man regards a 7-9 h.p. solo mount. In other words, she enjoys its speed, she thinks it very nice and sporting, she relishes the steady running with which sheer weight endows it, but she does not like handling it with the engine out of action: it is too heavy to be pleasant. If this is so, the girls when they join us in bevies will add a fillip to the lightweight push, and may adopt the improved baby two-strokes of the future as their pets. It looks as if the girls were going to have a big finger in our future. *The Motor Cycle* always said they would, but never foretold the exact method. The war has brought an apprenticeship to motoring in the way of thousands of girls, and they mostly wonder why they did not start long ago. Further, it has given them better wages: and if these wages last they will not be dependent on a generous father or an impressionable lad for a joy-ride. It will be interesting to see what dimensions this new demand assumes and how makers cater for it.

THE WATER-COOLED MOTOR CYCLE.

The Advantages and Disadvantages of Water-cooling as applied to Motor Cycle Engines.

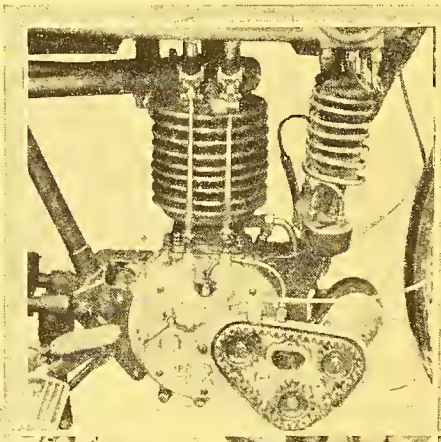
OWING to the great improvements discovered by aeroplane engine makers during the war, it is anticipated that after the war the position of the air-cooled engine will be assured, and that water-cooling for motor cycle engines will not be considered necessary.

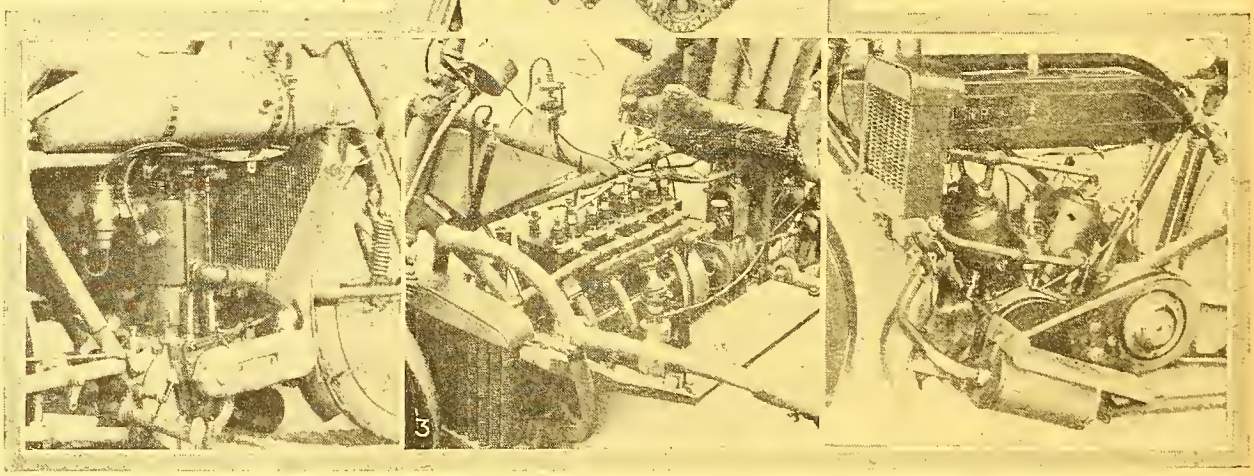


One of the latest water-cooled motor cycles to be introduced, the 6 h.p. Humber.

At one time it appeared that the water-cooled engine would eventually supplant the air-cooled type in consequence of the latter's extravagant use of lubricant. Instead of being air-cooled engines, many were really oil-cooled, and the amount saved in the cost of fuel was more than absorbed in the cost of lubricating oil. Earlier engines also were prone to overheat, and, when one reviews motor cycle history, it appears surprising, with such an easy way out of the difficulties as water-cooling, that the air-cooled engine was able to hold its own until its development was proved to be justified.

Undoubtedly both types have their advantages and disadvantages. The disadvantages of water-cooling are most apparent in cylinders of small capacity. The disadvantages of the air-cooled type are greatest when the cylinder is large, but during recent years it has become the practice not to use large cylinders, the multiplication of smaller cylinders having been found more suitable for automotive purposes. A multi-cylinder engine is lighter than a single-cylinder engine for the same power. In addition the torque is greatly improved as the number of cylinders is increased. Hence the largest cylinder now used in the world of motor mechanics, the tractor and the lorry excluded, is no larger than the size up to which the air-cooled cylinder may be taken. No motor cycle engines come near to this limit, but sometimes, owing to the limitations imposed by having to arrange the engine in a motor cycle frame, it is difficult to provide an adequate cooling draught. An example of this is found in large flat twin machines in which the rear cylinder suffers from an insufficient draught. The small opposed twin also suffers in this respect but as the cylinders are smaller the effect is not so apparent because it is not so near to the size limit as is the larger engine. From this it may be gathered that if water-cooling is used on motor cycles of the future it will be on large opposed twins only.





(1) A 1913 T.T. entrant, the 3½ h.p. Cayenne, with a cooling system composed of copper piping round the cylinder. (2) An O.H. water-cooled Jap-Bat. (3) The four-cylinder T.M.C. (4) The Fafnir water-cooled V twin, a type rarely seen on motor cycles.

The Water-cooled Motor Cycle.—

It may be thought that the four-cylinder engine, too, may require water jackets on account of the sheltered position of the rear cylinders. Here again the size enters into the question, and, as it is not probable that the cylinders of a four-cylinder motor cycle will be more than 250 c.c. capacity, it may be assumed that the four-cylinder of the future will be air-cooled because the size of the cylinder is so far below the margin where water-cooling becomes necessary.

As already stated, it is in the smaller sizes that water-cooling is a disadvantage, as then there is present the probability that the engine would be over-cooled. The smaller the combustion chamber the greater is its superficial area in proportion to its volume, and consequently, at a given rate of speed, the greater will be the amount of heat lost through the larger and relatively cold confining walls.

It can be said that the temperature of the outside of the cylinder walls of a water-cooled engine seldom exceeds boiling point (212° F.), while in air-cooled cylinders this is very much exceeded, with the result that a higher thermal efficiency is possible. This difference in temperature is also apparent when heavier fuels than the best petrol are used, as witness the more or less successful use of paraffin in air-cooled engines, while in water-cooled engines the results have not been so satisfactory.

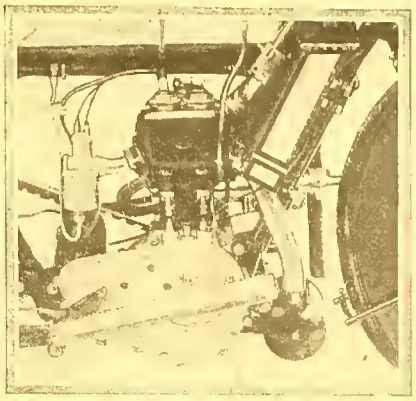
There is, however, another effect of wall area to be considered. It is well known that the efficiency of a given volume of gas mixture increases as the compression is increased up to certain limits. The cooler the charge is at the time of ignition the higher the compression can be carried. The walls of a non-water jacketed combustion chamber, while lower in temperature than the expanding charge, are considerably higher in temperature than the incoming charge. Therefore these hot walls preheat the charge during compression, and thereby tend to reduce the efficiency of the engine. Here we see one advantage of the water-cooled engine.

The two fundamental necessities of the motor cycle—light weight and flexibility—can be met satisfactorily only by an engine capable of continuous operation under full load at speeds of, say, 2,500 r.p.m. To obtain these results it depends upon the type and size of engine whether air or water-cooling is the best.

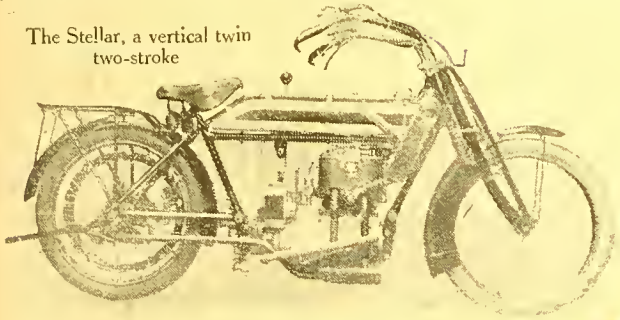
In small engines there seems no doubt that air-cooling, with its economy of petrol and wasteful use of oil, is a better proposition than the complications of water-cooling introduced to obtain a little extra power by the use of a higher compression and a little saving in oil. But in the largest sizes it is still an open question whether the advantages of water-cooling are not greater than the advantages of air-cooling. What these advantages and disadvantages are may be scheduled as follows:

AIR-COOLED ENGINES.

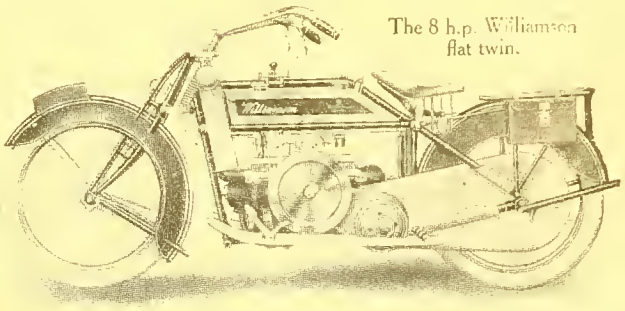
Advantages.—Extreme simplicity in design, decreased petrol consumption, no danger of ruining the cylinder through lack of



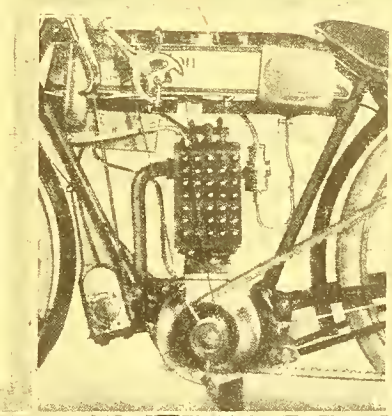
The 3½ h.p. Humber is the best known water-cooled model.

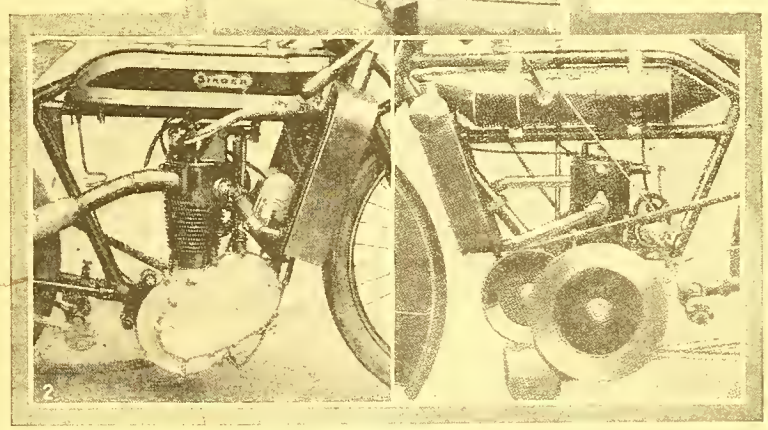


The Stellar, a vertical twin two-stroke



The 8 h.p. Williamson flat twin.



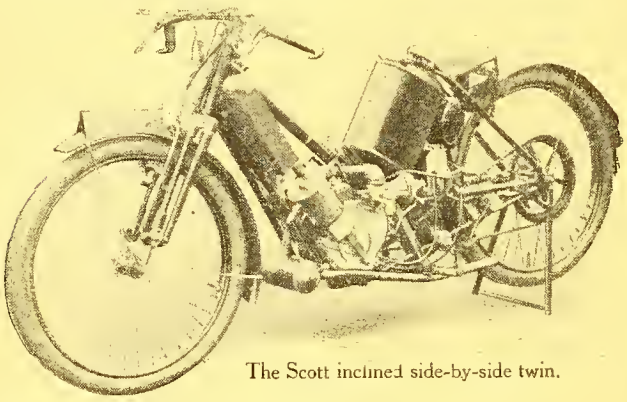


(1) The Green-Precision, a self-contained water-cooled engine. (2) The racing 3½ h.p. Singer, with water-cooled head. (3) A 4 h.p. single two-stroke with water-cooled cylinder—the Paragon.

The Water-cooled Motor Cycle.—

attention to the water supply, lower price, lighter weight, and neatness.

Disadvantages.—Somewhat excessive oil consumption, possibility of overheating on a long run in low



The Scott inclined side-by-side twin.

gear, and the inconvenience of the heat to the passengers.

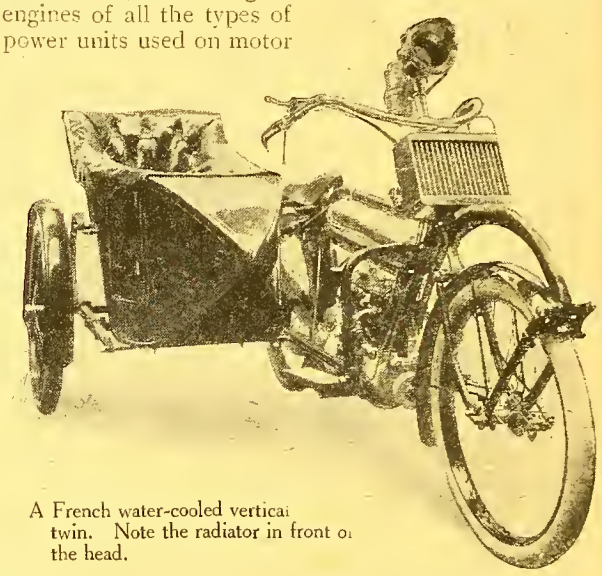
WATER-COOLED ENGINES.

Advantages.—Decreased oil consumption, increased power, quieter running, and cooler engine.

Disadvantages.—Complications, increased petrol consumption, increased weight, and the necessity to drain water from machine in frosty weather.

It is unfortunate that with the only type of motor cycle engine in which water-cooling appears to be necessary,—*i.e.*, the large flat twin—the disposition of the cylinders makes it extremely difficult to install the water piping so that it will look neat. It is also surprising that the type of engine which appears to require water-cooling less than any other—the single—has been water-cooled in greater number than other types. It is comparatively an easy matter to install water-cooling on a single, and this may be the reason.

The illustrations given here show water-cooled engines of all the types of power units used on motor



A French water-cooled vertical twin. Note the radiator in front of the head.

cycles, from which it will be gathered that water-cooling has received greater attention than may be imagined by those who have not closely followed the evolution of the motor cycle. VEDETTE.

CYCLE CAR BUBBLES.

The Growth and Decline of a Promising Industry

NO one can gainsay that the so-called cycle car boom in this country was little more than a burlesque. A hundred makes appeared and disappeared without seriously entering the market. Any contraption with a motor cycle engine and four wheels was "boomed" as a new and promising model. Others appeared on the market, but in a very short time only the fittest survived—and one could name them on one hand.

I think the majority of readers now will agree that *The Motor Cycle* was right in the attitude it took toward the majority of these vehicles. They were not sound mechanically, and the mother journal of the motor cycle industry was blamed for its lack of enthusiasm.

However, this is now history, but the commonsense attitude of *The Motor Cycle* at the time was disregarded by the cycle car enthusiasts of America who worked up a "boom" similar to the British fiasco, perpetrating the same mistakes but undoubtedly involving much more capital.

A High Mortality.

On the whole, however, the American cycle car was a better proposition than the British article, and sold at a price very much less than a sidecar combination. As in England, a hundred "makes" appeared—some were sold in this country—but only one remains, *i.e.*, the Saxon light car.

Of the machines known in this country the belt-driven Imp died in 1915, and the Argo, Ritz, Trumbull light cars in 1916. The Princess light car was enlarged and became a five-seater car, as did several others. Most of the American companies laid down plant to turn out large quantities—there was nothing of the garage-built one model only idea in their connection—yet the industry died.

And the Moral.

The moral to be taken from both the British and American lessons appears to be that the buying public does not want anything that is "cheap and nasty," and that our manufacturers should take warning that, unless they can produce a good cycle car at a low price, it will be better to leave the proposition alone altogether if reputations are not to be damaged in the process of attempting to cater for those who require a £150 proposition for a hundred pounds. A.

GERMAN ANTI-TANK ARTILLERY.

It is rumoured that the production of many types of guns has been suspended at the Krupp Works in order to concentrate on the output of anti-tank artillery.

PELMANISM AND THE SILVER BADGE.

By GEORGE HENRY.

IF it were within my power I would so order it that every Silver Badge issued to a discharged soldier would be accompanied by a free enrolment for a course of Pelmanism.

For Pelmanism is of the greatest import to the discharged soldier, and I am putting my views in regard to it upon record because I believe that the lessons to be learned from my own case may be of some service to many thousands of my comrades in the great Brotherhood of the Silver Badge.

It is just a year since the day when I cast aside khaki, consigned my tin of "Soldier's Friend" to oblivion, and feverishly arrayed myself in the most flamboyant clothes that my tailor and hosier could provide.

It is twelve months since the day I realised that, after nearly three years' service, I had become a free man—free to order my comings and goings as I listed—free from the tyranny of the bugle call; free to follow the dictates of my own will in everything, unhedged by restriction of prohibition.

And I was eager to burst upon a civilian world with all the theatrical *flaire* of a newly-discovered prima donna. In my innocence I thought that this same civilian world was waiting to lay bare its rewards before the sword of my wits.

But I was soon to discover that this view-point savoured of the unsophisticated. It had not occurred to me that the battle for a living was quite as strenuous as ever—indeed, had intensified during war-time—and that in going "over the top" in business or professional life one must still be equipped with the most effective mental munitions.

In my pre-war days I had gained a comfortable income in the practice of my profession. My mind had enjoyed ample exercise and was always (if I may be forgiven the simile) at "concert pitch." And so I thought that, with a world teeming with new topics, ideas, and ideals I could not fail to produce of my best and rebuild my shattered fortunes.

I took a holiday, and, returning, came to my desk filled with a resolve to work as never I had worked before.

It was just there that I came down to earth, and the bubbles of my childlike faith bespattered themselves on the stones of reality.

One morning of fruitless, futile scribbling showed me that nearly three years' service as a soldier had had its inevitable effect on my mental processes.

That nimble wit I had been so proud to possess positively would not be stimulated; that ability to analyse a subject and classify its components that had made my previous work clear and forceful had fled; that case in the choice of the right word that had made work a recreation had taken a fancy for aviation and winged away.

And it was not just a matter of mood, for this inability to work persisted. In a week or two there came the realisation that it was a chronic state. The reason was not far to seek. For nearly three years my every day's activities had been planned ahead for me. Almost my every action had been governed by the decisions of my superior officers. Day and night, week in, week out, I had, and rightly so, surrendered myself to the mechanical will of the military machine. My thinking had been done for me. I had no reason to think for myself. Indeed, I soon learned that "thinking for oneself" was a short path to the pleasures of "pack drill."

All of which resulted in a brain lying fallow. Its functions had not been properly exercised—it was a great obese brain, over-fed with facts and impressions, suffering from a species of mental indigestion, torpid and unresponsive to my will.

I had indeed come to a pretty pass! It was necessary for me to earn at least double as much as in pre-war days merely to provide the bread and butter of respectability. How was I to make provision for this—much less for the occasional jam that makes life livable—with my mind rusted, faculties blunted, and thinking-power to a great extent atrophied by disuse?

Obsessed by this sort of query, little wonder that that sneaking little traitor, the Imp of Introspection, came upon the scene. I gave way to depression and doubt, and feared for my future. I began to think that I was going to be one of life's "wash-outs," and, in the light of later learning, I really think I did for a time belong to that peculiar species of humanity—until Pelmanism came to me!

Until Pelmanism came to me—by the prosaic path of a daily paper announcement, and the subsequent clipping of a coupon. Many thousands of Silver Badge men have hesitated over that same coupon. I wish I could make them realise to the full the import of it. For Pelmanism gave me what it has given many a thousand men and women. It gave me courage first of all. The first "little Grey Book" refreshed and stung my mind into captivity, just as a plunge into a cold bath reinvigorates a tired body.

The Imp of Introspection and the legions of other mental devils who are his co-mates fled from my ken. I had no further use for them, and as "Grey Book" followed "Grey Book," and the fascinating exercise of Pelmanism unfolded their interest and charm, my mind began to bestir itself and throw off the shackles of its hibernation.

Pelmanism changed my whole outlook on life, gave me new interests, and made me THINK.

My mind began to function more speedily and easily, I found that I could collect my thoughts, concentrate on a subject, analyse and classify possibilities, and, finally, express myself without the hair-tearing and other temperamental performances which are popularly supposed to be the accompaniment of creative work. The upshot is that to-day my work is accomplished with ease, and I am never tired of reiterating the fact that Pelmanism pays for itself a thousandfold.

So much for my personal experiences of Pelmanism. I have dealt with my own case at length because it is typical of thousands of others. I have lately had an opportunity of investigating the work of Pelmanism, and found that the register of the Pelman Institute teems with cases of students who at their introduction to the Course had suffered from the same mental "dry-rot" that was once my portion. I found, too, that among my brothers of the Silver Badge there is a great army of Pelmanists equipping itself for the stern struggle for a living that follows the laying down of the weapons of war. In many cases, officers who have appreciated the qualities of the men who served under them have paid for a course of Pelmanism for such men on their discharge from the Service.

And no person who can read can escape the wonderful tributes which are being paid to Pelmanism by distinguished men in every section of the Press.

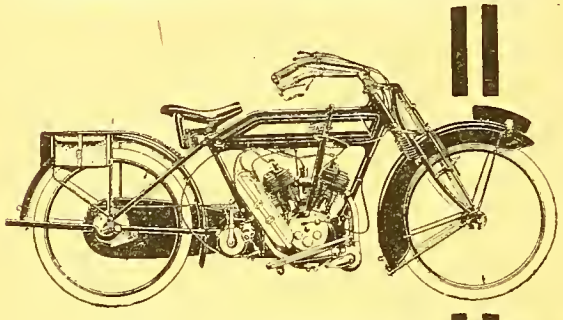
Yes. Pelmanism is without doubt a vital necessity for the discharged soldier. For it is men of the "Silver Badge" and their comrades who will return when peace comes—the youth of the world—upon whom the duty of rebuilding a new social order on the ashes of the old will devolve. It is the youth of the world who, when the peace comes, must so order things that the peace shall be kept and the earth cleansed of the corruption and loose things that played a great part in bringing about the mud-and-blood welter of the last four years. And to equip them for their labours in this respect, as well as for their own individual welfare, I think that Pelmanism is of inestimable value.

* * * *

The Pelman Institute publishes a small book, "Mind and Memory," in which Pelmanism is fully explained and illustrated: and a supplement treating of "Pelmanism as an Intellectual and Social Factor." These two publications, together with a reprint of "Truth's" Report on the Pelman Institute and its work, will be sent, gratis and post free, to any reader of THE MOTOR CYCLE *who addresses a postcard to the Pelman Institute,* 199, *Pelman House, Bloomsbury Street, London, W.C.1. All correspondence is confidential.*

The "JAMES"

Moderate-Weight Sidecar Specification.



Model 9, 5·6 h.p. Twin Engine.

A CAREFUL STUDY will show that besides embodying all famous JAMES features, it introduces many innovations, making for greater driving comfort and tyre economy.

Cyl. cap., 662 c.c.; Staggered Radiators, Interchangeable Cylinders, etc.; M.O. Valves, interchangeable, large diam., unbreakable; H.T. Magneto, chain-driven, dustproof; JAMES Countershaft 3-speed Gear and Kick-starter; Hand-controlled Clutch; All-enclosed Transmission, Hans Renold Chains, ⅝" × ¼"; Spring Drive in Chain Sprocket on Driving Wheel; Wheels 28" × 3"; Extra Heavy Tyres; Sight Drip-feed Lubrication, with Auxiliary Hand Pump; Rear Foot Brake, etc.

Let us tell you more, and have your name for early delivery of this or any of the older JAMES models.

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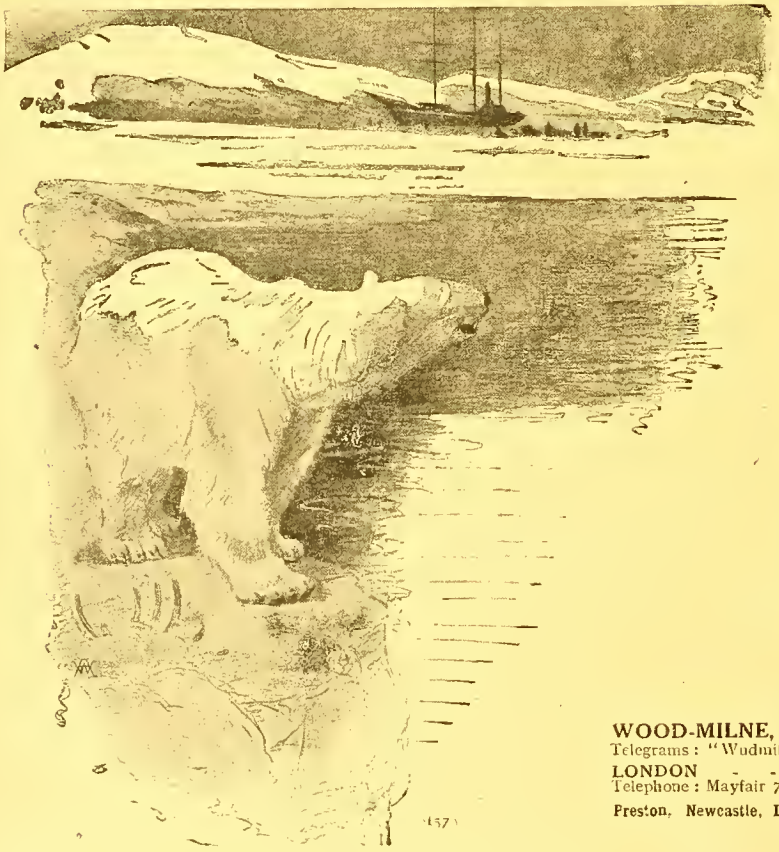
Broad Street Corner.

R H 8



Discovery

Every great industry has its root discovery on which it has been built up. Far reaching as the results have been, there is little or none of the glamour which attends the efforts of the explorer—probably because of the lack of adventure and the secrecy so often necessary.

The rubber industry owes its present mammoth proportions to the discovery of the process of vulcanisation.

This was found by two men almost simultaneously—one in America, and the other in England. Chemists of all nations have built on the foundation they laid, and no more striking instance of the perfection obtained can be found than

Wood-Milne
British-made
Motor Tyres

The Hall Mark of Quality.

WOOD-MILNE, Limited, 21, Albion Street, Gaythorn, Manchester.
Telegrams: "Wudmiln, Manchester." Telephone: 8774 City (3 lines)
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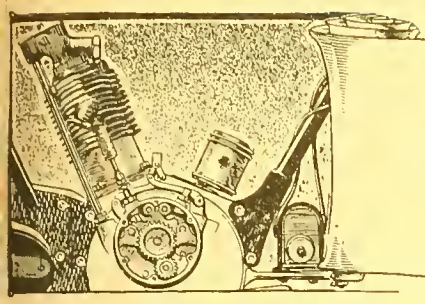
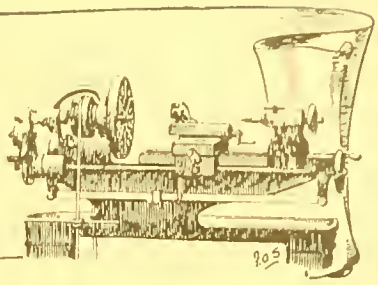
Telephone: Mayfair 735, 6789, 6790. Telegrams: "Wudmiln, Wesdo, London."
Preston, Newcastle, Leeds, Birmingham, Bristol, Glasgow, Dublin, Belfast, Vancouver Calcutta, Bombay, Johannesburg, etc.



TORQUE IN MOTOR CYCLE ENGINES.



The Inertia Effects of the Reciprocating Parts of Petrol Motors.

IN *The Motor Cycle* some time ago an article by "Engro" appeared showing very clearly the physical meaning of turning moment or "torque." and how to construct, for a petrol motor, a polar curve giving the turning moment at each angular position of the crank. It is proposed in this article to show how the turning moment is modified, and how the above curve should be corrected, so as to include the inertia effects of the mass of the reciprocating parts. For fast-running engines like petrol motors this correction amounts to a fairly large percentage of the average turning moment, and for certain portions of the design of such engines it can by no means be ignored. For example, the designing of a flywheel to keep the variations of speed within prescribed limits would demand a fairly accurate turning moment diagram, or at any rate the knowledge of a correct value of the ratio of the maximum turning moment to the mean. It may therefore be instructive to outline a simple method of allowing for the dynamical effects; and, as an example, to show, in the case of a well-known cycle engine, the difference between the twisting moment curves (1) when the inertia effects of the reciprocating parts are included and (2) when they are omitted.

In a general way it can be seen that the reciprocating parts, starting as they do from rest at the beginning of a stroke, acquiring a maximum velocity at approximately the middle, and being reduced to rest at the end of the stroke, will entail a disturbance of the forces involved. For at the beginning of the stroke the mass of the reciprocating parts has to be accelerated, and the force necessary to do this must be deducted from the total gas pressure acting on the piston, leaving only a balance of this available for producing turning moment at the crank pin. Similarly at the end of the stroke the mass of the reciprocating parts has to be retarded, and the force thus given up must be added to the total gas pressure then acting on the piston, thus giving a larger effective force available for producing turning moment at the crank.

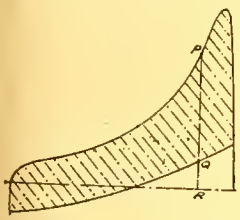


Fig. 1.—An indicator diagram modified to show the dynamical effects of the reciprocating parts.

How to find the Inertia Curve.

The usual method of correcting for the dynamical effects of the reciprocating parts is to modify the indicator diagram by drawing on it a curve whose ordinates show, for each point of the stroke, the force (reduced to lb. per square inch of the piston area) necessary to accelerate or retard the reciprocating mass. The modified diagram will then be something like that shown in fig. 1, and if the inertia curve thus drawn be used instead of the horizontal as a base line, the ordinate such as PQ so obtained will be the pressures which are effective in causing crank effort; the reason being that of the total pressure PR existing at the point R of the stroke, part RQ is required to accelerate the reciprocating parts, leaving only QP effective for producing crank effort. It will be observed that the general effect of using this curve as a base line is to give a somewhat more uniform effective pressure throughout the stroke, the shaded diagram approaching a more nearly uniform width than the unmodified indicator diagram. It is hardly necessary to remark that the diagram so corrected gives precisely the same *average* pressure, and therefore work done, during the stroke as the original diagram; the rate, however, at which work is done at any point of the stroke is different in the two cases.

There are several methods of drawing the inertia curve for any given case, but probably the best for practical purposes is to use a graphical construction very simple to carry out. In fig. 2 let OA be the line of centres of the engine, OR the crank radius, and PR the connecting rod. Select some four or more equidistant points in the stroke, two of them being the dead centre positions. At each of the chosen points, such as P, describe a circle on the connecting rod as diameter; also describe a circle with R as centre and RT radius. Let the common chord of these two circles cut the line of centres in Q. Then the ordinate PN of the inertia curve (see fig. 1) to set up at the point P of the stroke

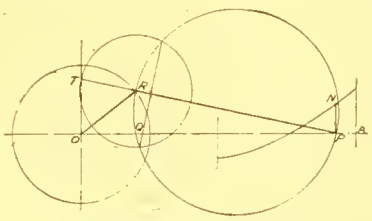


Fig. 2.—A graphical construction showing how the inertia curve should be drawn.

$$= .00002839 \times \frac{Wn^2}{A} \times OQ \text{ (inches)}$$

where W = weight of reciprocating parts (lb.), *i.e.*, piston with rings, gudgeon pin, and half weight of connecting rod.

n = revs. per minute.

A = area of piston (sq. in.).

Torque in Motor Cycle Engines.—

A few points such as N obtained in this manner for each of the selected points will be sufficient to sketch in the curve, which is then associated with the indicator diagram in the manner previously described.

It may be observed that, although for a cycle engine the reciprocating mass W is not large, yet the inertia pressure is not only dependent on this, but also on the *square* of the number of revs. per minute, and it is the high value of the latter figure in this class of engine which accounts for the importance of the inertia effects.

A Concrete Example.

As an example in obtaining the correct turning moment diagram in an actual case, let us consider the 85 × 88 mm. Triumph engine.

In this case the weight of reciprocating parts (*i.e.*, piston with rings and gudgeon pin plus half connecting rod) = 2.19 lb.

n = say, 2,000 revs. per minute.

A = 8.8 square inches.

The expression for the pressure to be allowed for the inertia effects therefore becomes

$$.0000289 \times \frac{2.19 \times 2000^2}{8.8} \times OQ'' = 28.80 \times OQ''$$

At the beginning and end of the stroke OQ will be found, by the graphical construction above described, to be 2.14 inches and .86 inch respectively. The two pressures at these points are therefore 62 lb. per square inch and 25 lb. per square inch respectively; and if two additional intermediate points be found in precisely the same way the curve may be sketched in, and will be approximately as shown at MN in fig. 3. Applying this to the indicator diagram for the explosion stroke, we find the pressures which are effective for producing turning moment at the crank are given by ordinates of the shaded portion of the diagram. Measuring pressures from this, and following out the usual method of determining the turning moment at each point, we obtain the polar turning moment diagram A of fig. 3.

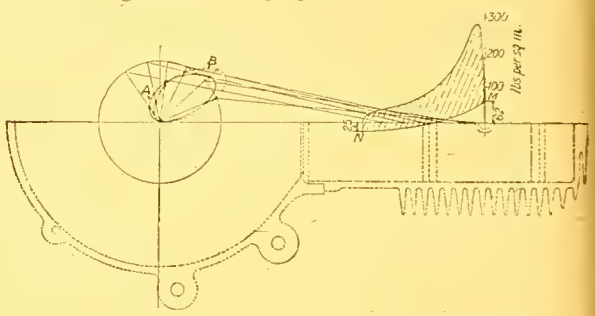


Fig. 3.—The torque, curve A, of an 85 × 88 mm. Triumph engine obtained in the manner described. The curve B shows the turning moment uncorrected for inertia.

Had the pressures as measured from the original indicator diagram, uncorrected for inertia, been used the turning moment diagram B would have been obtained. The maximum turning moments in the two cases are approximately 192 lb.-ft. for A and 225 lb.-ft. for B, equivalent to an excess of some 18% for the uncorrected over the corrected value.

G. M. RUSSELL.

IN THE HOLY LAND.

Despatch riders bartering for oranges in Palestine. The mounts are, as is usual in the Near East campaign, loaded to their utmost with kit.

SPARKING PLUGS.

WE have heard of some low-priced American aeronautical plugs that have been tested in a pet twin. These are made to be sold at a dollar in the country of their origin, and, though they have not the finish which we have been led to expect here, they are pretty serviceable, and the turned fins undoubtedly assist in keeping them cool. After some 3,000 miles they are still sparking perfectly, and have only been out for inspection. The electrodes are very slight, and are somewhat heavily pitted. Before this has been carried too far our informant proposes to fit a pair of those dainty little plugs that are made for rotaries. These are made by a Midland firm, and the little things measure less than 2in. overall.

CURRENT HAT

Times to Light Lamps.

GREENWICH TIME.

Oct. 3rd	...	...	6.4 p.m.
,, 5th	...	...	6.0 ,,
,, 7th	...	...	5.54 ,,
,, 9th	...	...	5.49 ,,

The Smith Motor Wheel in Korea.

The Smith motor wheel, which is the American Auto-wheel made under licence, is being sold in some quantities in Korea, and is being largely used by the natives.

Danger of Riding with Head bent down.

Two American naval men, riding on motor cycles, with their heads bent down, dashed into a wall, and were picked up unconscious, both suffering from concussion. One of them, said to be the son of a millionaire, has died since admission to hospital.

American Motor Cyclist Wins Service Cross.

Pte. Louis H. Harkenrider, of Griffith, Indiana, a crack motor cycle rider, has been cited for gallantry in action by General Pershing: "On June 6th, 1918, in the vicinity of Chateau Thierry, with a corporal, he went out into an open field, under heavy shell and machine gun fire, and succeeded in bandaging and carrying back to our lines a wounded comrade."

Running on Solid Fuel.

Petrol, petrol substitute, or any form of gas or *liquid* inflammable fuel capable of being used in an internal combustion engine may not be used except for purposes allowed by and mentioned in the Motor Spirit Order. As solid fuel does not come under these headings, it may, if it can, be used at present for any purpose. That well-known competition rider, A. G. Fenn, c/o Messrs. Guthrie and Co., 5, Whittington Avenue, E.C., has experimented with a solid fuel which can be obtained almost anywhere and has had some success. For a small sum he will tell readers how to equip their machines, and forward them photographs of the arrangement fitted to two makes of motor bicycles, a set of blue prints, and some instructions. Those who are mechanically-minded and are handy with tools can rig up the arrangement themselves for an expenditure which is not ruinous, and though quite the same results as with petrol may not be obtained, the machine can be run, which is, of course, better than leaving it to rust in the motor house. We have been unable to try it yet, but hope to do so shortly.

Our Allies' Sidecar Outfits.

One may daily see Indians and Harley-Davidson machines with sidecars fitted on the right-hand side flitting about the Metropolis. The machines belong to our American Allies, and the exhaust of the machines is, to say the least, healthy.

A Specification.

An American cycle car enthusiast sends us the following specification of the modern young woman: Streamline effect, usual dash and curves; body, partly enclosed; shafting, visible; three speeds (social, home, and office); equipped with sparking device: more hair top: no upholstering; power, unlimited; stunning lamps: extra tired; self-starter; finished in rouge and carmine.

Motor Numbers on Commercial Vehicles.

The Commercial Motor Users' Association is informed by the Road Transport Board that, so long as vehicles are legibly marked with the transport registration number, the Board do not intend to insist that the number should be placed in any particular position. It is, however, suggested that the number should be marked on the near side of the vehicle following the name and address.

Special Features.

WATER COOLING.
SINGLE-TRACT PASSENGER MACHINES.
TORQUE.

Congratulations.

Last week we congratulated "Chinook" on his award of the Croix de Guerre for devotion to duty. To-day we again offer him heartiest congratulations, this time on the occasion of his wedding, which took place on September 25th.

Women Postmen Motor Cyclists.

In Providence, Rhode Island, U.S.A., young women are wanted to qualify as special delivery clerks in the local post office. This is owing to the shortage of men already being felt in the United States. The first to enrol was Mrs. Mary C. Englehardt, who did not own a motor cycle until a week before she took up the position. Her costume consists of bloomers and a suitable coat and cap. She is the mother of a child of eight years old, and has successfully mastered her machine, being able to thread her way through heavy traffic without difficulty.

How the Germans generate electricity for wireless in the trenches.

"Want a Lift?"

Many American motor cyclists are displaying signs on their outfits: "Salute, and Jump In." Any man in uniform is welcome to take a lift in a vehicle labelled this way that is going in his direction. The idea seems a good one, and would be worth copying over here if our motoring was not confined to keeping up the insurance payments.

The Industrial Reconstruction Council.

A conference on Interim Industrial Reconstruction Committees will be held under the auspices of the Industrial Reconstruction Council on Tuesday, October 8th, at 6 p.m., in the Hall of the Institute of Journalists, 2 and 4, Tudor Street, E.C.4. The subject will be introduced by Mr. W. Henderson Pringle, of the Ministry of Reconstruction, after which the discussion will be open. No tickets are necessary.

Motor Cyclists Wanted.

The A.S.C., M.T.V., Northern Group, are in need of a few motor cyclists, riding sidecar combinations and also solo machines, fully to complete the sections. They will be engaged on useful night transport work and Sunday runs. Free petrol is provided for the purpose. Application should be made to the Headquarters, A.S.C., M.T.V., Northern Group, Market Chambers, Church Street, Enfield.

This was formerly the County of Middlesex Motor Volunteer Corps, Northern Group. We made mention of the A.S.C., M.T.V., in a recent issue of this journal, with the result that quite a number of motor cyclists were enrolled for the night transport of troops.

Costing.

A series of lectures will be held by the London School of Economics and Political Science at Clare Market, Portugal Street, Kingsway, London. W.C.2

The lecture on October 16th is entitled "Costing as applied to the Motor Industry," by Mr. C. W. Reeve, accountant, Associated Equipment Co., Ltd., with Mr. C. E. Everard-Greene, of the British Tabulating Machine Co., Ltd., in the chair.

Is a Wedding a Public Duty?

When the latest petrol restriction Order was introduced the Controller stated that while a funeral was of sufficient national importance to justify the use of petrol, a wedding was not. In other words, if you felt that you must have a joy-ride you must take it in a shroud and not in a wedding dress. The Liverpool magistrates have, however, now decided differently, and a wedding dress is put on an equal footing with a shroud. So now, ye would be joy-riders, be patriotic.

The B.L.I.C. Magneto.

On September 27th, a party of journalists were shown round the works of the British Lighting and Ignition Co., Ltd., at the invitation of Mr. B. L. P. Caillard and the management of the company. It may be remembered that between the end of 1916 and the beginning of 1917 this firm took over from the Board of Trade the premises and the whole business of a well-known German magneto firm, and started to manufacture a magneto of its own, called the B.L.I.C., which is equal to, if not better than, its German parent. The building, originally constructed for an office or workshop, is now a complete factory, in which every part of the magneto is made. Under the able guidance of Mr. A. E. Bennett, who has been connected with the magneto industry from its very inception in this country, we made a tour throughout the whole works. Mr. Bennett is well known to many motor cyclists, and takes a keen interest in the pastime, being a frequenter of many important meetings before the war. The visit was a most interesting one, as it included a walk through every department from the stores in the basement to the top floor, and enabled one to see every phase of the construction of a magneto from start to finish. The British Lighting and Ignition Co. have made twenty-six different types of magnetos, from the tiny lightweight instrument for 1½ h.p. motor bicycles to the giant magneto, weighing 63 lb., for a 2,500 h.p. gas engine. It was extremely edifying to note the accuracy with which the magnetos were made, only $\frac{1}{100}$ mm. margin being allowed. Though B.L.I.C. magnetos are now being made for Army motor cycles and heavy vehicles, the chief work of the factory is to turn out these instruments for aviation work. But as soon as possible after the war much larger works will be taken over, when all types of magnetos will be made in quantities, and lighting sets will also be manufactured. The company is an offspring of and is owned by Messrs. Vickers, Ltd. The visitors were afterwards entertained to luncheon at Frascati's, where each guest was presented with a handsome four-bladed pocket knife—"a memento symbolic of the cutting of German associations by British enterprise."

A busy scene just outside Bapaume during the recent British attack.

THE MOTOR CYCLE

AVIATION SECTION

Star Aces and the Psychological Tests. London to India Flight.

An Aeroplane from Swaziland.

Chiefs and people of Swaziland have sent £2,000 to buy an aeroplane for the Royal Air Force.

—◇□◇—

An Altitude Record?

An American pilot flying a de Havilland machine equipped with a Liberty motor, and carrying a passenger, succeeded in flying to a height of 25,500 feet recently.

—◇□◇—

Huns and Scraps.

Straws show which way the wind blows, as witness the following extract from a German Army Order: "In view of the present situation as regards raw material, our aeroplane industry is more and more reduced to relying on the working up of motors and instruments saved from destroyed aeroplanes. Thus, the supply of material to the Front has become essentially dependent on the return of waste material from the Front."

—◇□◇—

Zeppelin Wreckers Rewarded.

Maj. Egbert Cadbury, D.S.C., Capt. R. Leckie, D.S.O., and Lt. R. E. Keys have been awarded the D.C.F., and Pte. A. T. Harman the D.F.M. The officers attacked and destroyed a large airship that recently attempted a raid on the North-east coast, and also succeeded in damaging a second airship.

Pte. Harman, it is stated, showed gallantry in assisting in the destruction of an airship.

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Psychological Moments.

Following America's example, the British authorities have instituted psychological tests for aviators. One of them, and not the least searching, you can try for yourself. Spread a box of dominos face downwards. Get a friend to time you with a stop watch. You have to put them face upwards, and then put them all end to end, with the pips properly corresponding. If you can do the job in a minute you have good "reflexes," and the chances are you would be a decent pilot. Many men boggle hopelessly over it, and occasionally I have seen a man absolutely stuck, his hands trembling with nervous helplessness. Fifty-five seconds is a "star" performance.

Of course, this is only one of the tests. Pneumograph readings of resistance to shock and fatigue are considered of importance. But it is amusing to note that several well-known "aces" have shown up very poorly in these tests, and would have been rejected as unsuitable for flying if we had had time for psychology in those early days!

Royal Canadian Air Service.

The establishment of the Royal Canadian Air Service has been completed. Discipline in this corps will be the same as that in the Canadian Navy.

Officers of this Service will wear blue serge uniform with Sam Browne belt.

—◇□◇—

That R.A.F. Uniform.

A week or two ago we jokingly asked what the autumn fashion in R.A.F. uniform might be. A leading London tailor informed an R.A.F. officer last week that the light blue may yet be a "wash out" and navy blue adopted. At any rate, the light blue is not generally favoured for service wear, the cloth being delicate and liable to fade, quite apart from the exorbitant prices asked for it. In the meantime, the mixtures of khaki raincoat and British warm with the light blue is like nothing else on earth.

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The Handley-Page Infant.

An amusing story is told against Mr. Handley-Page concerning those early days when he was experimenting with a tiny monoplane. The man who was to build our big bombers for us had gone up to give his little 'bus a trial flight. All went well, but when he tried to alight he came down heavily, bumping right across the aerodrome like a rabbit. Getting out, he asked a bystander "if he had seen his landing?"

"Should say so," said the stranger, "*I saw all of them!*"

Aeroplanes Feared more than the Devil.

Reuter's correspondent, describing General Allenby's wonderful victory in Palestine, says: "Roads near Nablus bear terrible evidence to the efficacy of the bombing of our aviators, being in some places absolutely impassable and littered with material of all sorts.

"The airmen simply flew a few hundred feet above, and loosed bombs upon the fugitives. The inhabitants of Tul Keram state that the Turks feared our planes more than the devil."

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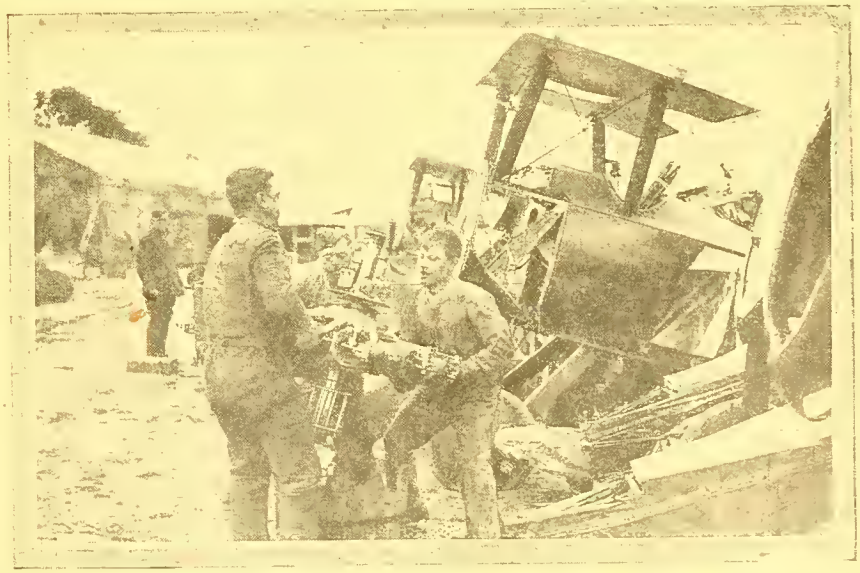
From London to India by Aeroplane.

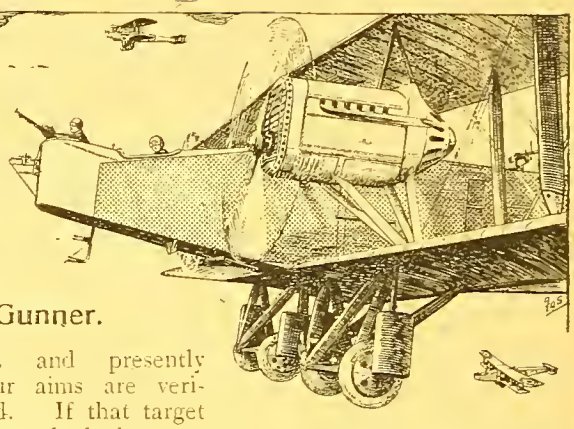
During a visit to the Handley-Page works, Lord Montagu of Beaulieu said that no doubt he would accompany Mr. Handley-Page one of these days on a voyage from London to India. Ten years ago, 9 st. was the limit of weight which an aeroplane carried. To-day, a load of 3½ tons was thought nothing of. He predicted a great commercial future for aeroplanes, particularly when the problem of producing a silent engine was solved. Mr. Page remarked that commercial aviation loomed large in the public mind at the present moment, and in that respect they had made progress with great strides. This was no doubt due to the driving force of the war. The Handley-Page machine had carried the greatest weight ever borne by any one aeroplane, viz., twenty-one passengers and a pilot.



A hospital for damaged aeroplanes in France. Removing engines for examination.

GUNNERY IN THE AIR

BY "Torque"



The Graduation of an Aerial Gunner.

WE all talk glibly of "sniping" nowadays, but shooting seems a bit of a lottery at the best when one begins to study it scientifically. You learn that the discharge makes the barrel of the rifle jump, and that a barrel may jump up or down. You find that gravity steadily pulls the bullet down, that the bullet drops perhaps 2in. in the first 100 yards, 6in. in 200 yards, 2ft. in 400 yards, and so forth. You are taught that wind sways the travelling bullet sideways, and learn to classify winds of varying strengths by the Beaufort scale. You realise that winds blow straight at you, straight across you, and from an infinite variety of corners and angles. Then you test your own aiming powers, and probably find you cannot sight a rifle accurately at a black spot on a white card twenty yards away, nor even sight it inaccurately with the same kind of error twice running. Then you are allowed to fire a blank cartridge, and you find that you pull the muzzle off, and your eye flinches, and your stance is infirm. Finally you sit at the trigger of a machine gun and feel as if you were trying to thread a 000 needle whilst seated on the back of an inebriated mule. At last you graduate as a decent ground gunner, and marvel at the ingenuity with which mechanism, properly used, eliminates such limitless possibilities of error.

A New Line.

After a year on ground guns you get fed up with the mud, and wangle a transfer to the R.A.F. You hear with a half smirk that good gunners are valued in the R.A.F. "No flies on my gunnery!" you soliloquise complacently, as you show a squad of potential tankers how to put a burst of five bullets from a Vickers into any 2½in. square they select on a chess-board target. You eye the novices in gunnery at the R.A.F. school rather contemptuously, as a much-enduring N.C.O. takes you through the familiar "immediate action," "sequences," and the like. You smile when a foolish instructor has the impudence to talk of your bullets scattering over a 20ft. ring in the air at 100 yards range. You are going to show that instructor something. Have you not been in France for a full year, eating, sleeping, and fighting with guns all the time?

Not so Easy as it Seems.

You are sent up to show what you can do with a target plane. You have not got a real gun, of course. But you have got an ingenious aim tester which will show that blinking instructor whether you can line up gun sights or not. You come down again—perhaps just a *leetle* wee bit uncertain as to whether your sights were plumb on for that last shot. The instructor strolls up, and presently your aims are verified. If that target plane had been a Hun, you would be getting somewhat "high" before next week-end: for it is demonstrable that all your shots went woefully wide!

Tricky Work.

So when you somewhat recover from the shock and recognise you have still something to learn, you go to school again. You realise that when two aeroplanes manœuvre at 150 m.p.h. apiece, the range opens and closes somewhat fast—occasionally at a rate of 300 m.p.h. You grasp the fact that pilotage has to be very delicate when you aim a fixed gun to a hair by bodily tilting the aeroplane to a matter of half an inch error or so. Ground winds fade to nothingness when you realise what an air blast is created by travel at the rate of two and a half miles per minute—why, you used to grumble at a 20 m.p.h. wind on the ranges, and 40 m.p.h. spelt a gale! Or again, your target is shifting through space at a speed of, say, seventy yards per second: and the most badly frightened pickelhaube you ever sprayed on the ground in Flanders never did more than four yards in that time. Then the target moves in so many planes. And half the time you cannot see him, because he is beneath or above or behind one of your wings. And the ranges in the air are so absurd. If you open fire at 500 yards people say you are swanking, or that you have got a gust up. The best men seem to dodge in to about 50ft.—20ft. for choice—and loose off about a hundred rounds or so. Old associations of a single meditative round at 1,000 yards on the Bisley ranges seem to belong to another world, as indeed they do. You conceive a dogged incredulity about the Bishops and Balls and McCuddens, whom a venal press credits with dozens of definite victories. Must have been Archies that hit those Huns, you fancy.

* * * * * *

Once again you learn that mechanism, plus brains intelligently applied, finds no obstacle insuperable. Incredible as it seems to you at the time, after a few weeks' training you develop into a totally dangerous aerial gunner. Put a Hun within a mile of the two vicious grey Vickers' snouts adorning your fuselage. Give you the speed to catch him, and either plenty of pals at hand to fight his friends off, or a fairly vacant sky. Sooner or later his head will be neatly ringed in your sights, and your rounds will be grouped in a reasonably small circle round that selected centre. It may be miracle; if so, it is the sort that still happens.

THE RIGGER'S JOB.

By TORQUE.

The Influence of First-class Rigging on the Efficiency of an Aeroplane.

"DADDY, what did you do in the great war?" "I tightened wires on aeroplanes, my child."

It sounds a poor answer enough, but every pilot knows that a first-class rigger is worth his weight in gold. In the messes of the R.A.F. N.C.O.'s and air mechanics, where many a reputation of newspaper or domestic origin is ruthlessly torn to shreds, the good rigger is honoured as a man among men. And well he may be. He is to the aeroplane what G. E. Stanley used to be to a Brooklands Triumph, and a bit more. For four points, vital to the efficiency of a squadron, depend on the rigger's skill:

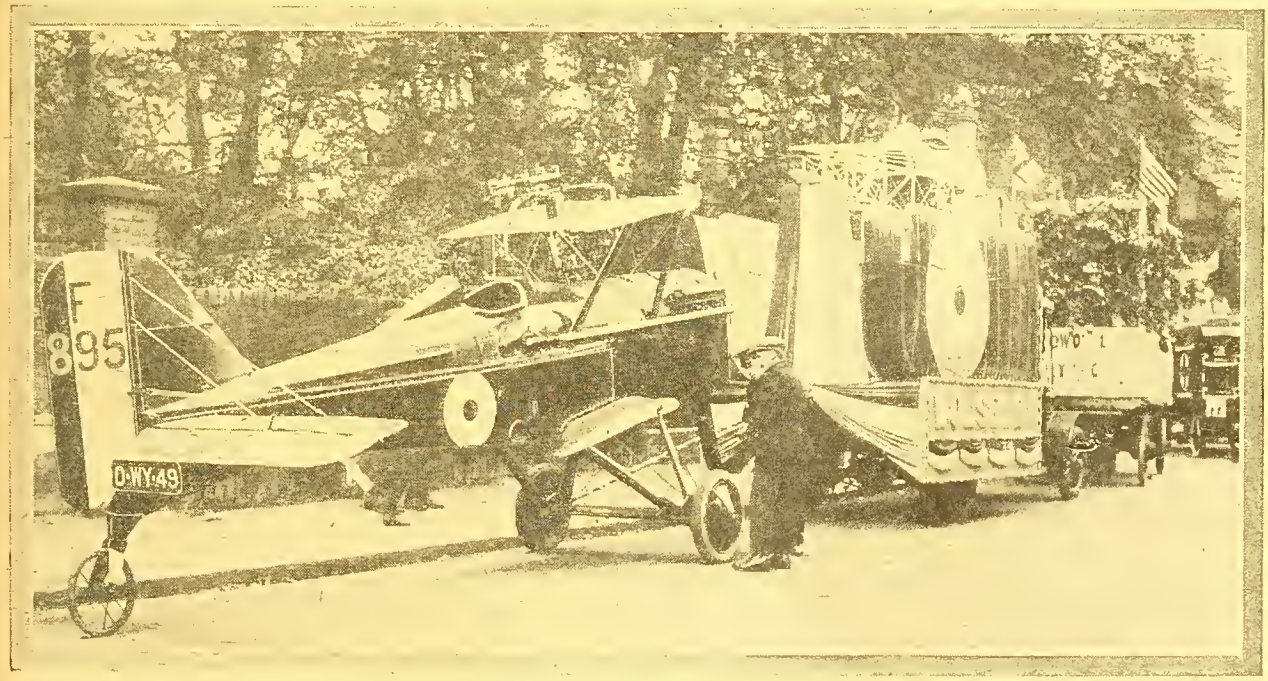
(*a*.) The lives of the flying officers.
(*b*.) The speed and climb of the aeroplane.
(*c*.) The life of the aeroplane.
(*d*) The control of the machine.

A word on each point may interest readers who are not familiar with the tuning of an aeroplane.

As regards (*a*), an aeroplane is built of bits of wood, most of which an average man can snap across his knee: and of cloth which a strong pair of hands can rip across. These flimsy substances are knit by triangulated girders of wire into a structure proof against stresses running into hundreds of tons at certain times—*e.g.*, when flattening out after a dive with engine on. The wire is carefully scrutinised after manufacture, during storage, and at issue. A bad rigger can nullify all these precautions. He may "kink" a length of piano wire: he may wink at a bad splice in a cable: he may be too lazy to scrap a "ferrule" which his pliers have mismade: he may fail to lock a turnbuckle: he may overlook a damaged thread on the bolt of a wiring plate. The machine goes up with less than its requisite "factor of safety" to oppose to some particular strain. In a tight corner, with life and death for the stakes, a harassed pilot chances a manœuvre which he knows will rack the old 'bus to the last ounce. The faulty wire parts with a "tang." The wire immediately opposed to the lost wire instantly feels the strain. The entire complex system of counterbracing is possibly disorganised. Surfaces are displaced, and cast illegitimate strains on other surfaces. The aeroplane crumples up. The pilot is killed. The formation is weakened. The tactical success of the patrol is threatened. The long-suffering infantry below lose the expected protection, assistance or information. . . .

The influence of rigging on speed and climb needs no emphasis. Angles of incidence, stagger, wash-in and wash-out, are worked out by designers to half a degree. An angle of half a degree on a plane measuring, say, 6ft. from front to back, can only be set by the most exact and painstaking adjustment of the wires. But quite a small blunder will, so to speak, convert a T.T. Indian into a baby two-stroke.

"Life," as applied to an aeroplane, means one of two things. Sooner or later every aeroplane is "written off," either as "missing" or as "crashed and unserviceable": in other words, death may come to an aeroplane suddenly in battle, or as the result of old age. We have already seen how a dud



The Wolseley exhibit during the recent Birmingham "Win-the-War" Day. The procession consisted of munition firms' exhibits, and military and naval units, including an American battalion.

The Rigger's Job.—

wire may make all the difference between death and a Military Cross to a pilot—*i.e.*, cause him to crash instead of flying home victorious. Similarly, bad rigging wears a machine out very quickly. Overtaut wires bend struts bow-shaped, and the whole machine goes "soggy." Overtaut wires make wiring plate clips eat into woodwork. Slack wires let everything develop play and looseness. The process is rapid. On one occasion a squadron received three new aeroplanes one Saturday, and had written them all off before the next Saturday, simply as the direct result of bad rigging.

The Value of the S.M.A.

Control also depends upon rigging. For example, the angle of incidence of the main planes is specified to half a degree. If one wing is given more incidence than the other the machine will try to fly in a circle, and the pilot must give it rudder all the time. Good for speed, eh, when chasing or escaping all out? Or similar errors may cause a machine to fly crabwise, or nose-heavy or tail-heavy. Goodbye to the months of labour by which engine designer or plane designer tried to endue the British pilot with a better speed or climb than the Hun. For the beautiful engine is trying to haul along a hefty great air brake at 150 m.p.h., since the pilot has been forced by a clumsy rigger to hold his rudder on or a wingflap down. And the plane which its inventor pictures as a streamlined swallow has been distorted to a caricature of an irregular polyhedron by falsely-tensioned wires and careless measurement of angles. Sometimes worse things happen. The pilot tugs at his joystick or pushes on his rudder bar, and the control refuses to budge. A control cable has jammed in a pulley or fairlead; he stiffens up the pressure, and something gives. The brakeless motor cyclist on Birdlip is in a better plight than he.

All honour to the "ack emmas" of the R.A.F. that our standard is so high. Day by day our squadrons fly, and many times a day. Seldom does one hear that the ground staff has failed to put the crowning touch on the work of designers and makers and munition staffs at home. Seldom does one hear a pilot say, "Yes, I should have brought that stunt off all right if it hadn't been for that blinking ass of a rigger." We have thousands of riggers now, nearly all of them keen, efficient, tireless, and trustworthy. How many Englishmen had glimmerings in 1914 of how an aeroplane is rigged? The S.M.A. ("Schools of Military Aeronautics") have done their work well.

IMPRESSIONS.

The Following Extract is taken from a Letter written by a Young American Pilot, now in Training in France, to his People in New York City.

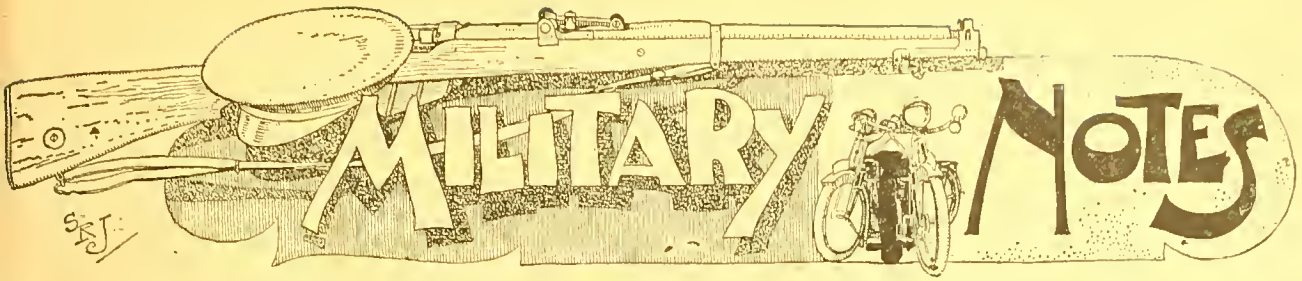
"FEELING a bit coltish, I went on over the château where Jacqueline lives, dropping low over the beautiful Corot Forest, and came back. Looking down, I could see the backwash of my 'prop' waving the trees.

"That 'zooming' was fun, and going back I tried it some more. Technically, it is contour-flying and is strictly *defendu* for such as me. I know I shall be ruined for anything else from now on. In Middle Tennessee they say if you teach a horse to jump fences he is no good after that because he likes it too well.

"It is as different from ordinary flying as riding an Indian or Harley-Davidson is from motoring, only it is a hundred thousand times more thrilling than motor biking. It is smooth like motor boating, and you have the same wave motion and the sensation of rushing movement. It is more thrilling than aquaplaning—that kingly sport, consisting of being towed on a board behind a fast motor boat. It partakes of the elements of all these.

"The ground flows past in a magnificent stream. Flying at an altitude is like floating, and if it were not for the beauty of the clouds above and landscape below it would be monotonous; but not so with flying low, where one has to be alert and quick. It is really dangerous, because if the motor 'poops,' it means either sudden extinction or miraculous escape. There is no time to think, and even if you thought, there is nothing that you could do about it. You are down and out before you know it."

Two views of an Austrian flying boat captured by the Italians. (*Aerial Age Weekly.*)



Tank Exploits. Interesting Correspondence. Discharge Gratuities.

DISCHARGED MEN'S GRATUITY.

AN Army Order has been published making it clear that the gratuity payable to a soldier on discharge from the Army is not to be given in the case of a man formally discharged to take up a commission.

A SAPPER'S CRITICISMS.

WE have received a letter from Sapper F. H. Douglas, formerly manager of one of the departments of Maudes' Motor Mart. Writing from "Somewhere in France," he says, "I have read the article in the 'Blue 'Un' of the 22nd August, 'Motor Cycle or Train,' with great interest, and on going into the mileage and times stated find that the average speed was just over 60 m.p.h. Surely this cannot be correct! Perhaps this is a type error.

"My comrades and I usually debate the contents of the 'Blue 'Un,' which I receive regularly, and there is usually a scramble to read the news. There is no doubt that the experience gained will make the post-war machine almost perfect, and such runs as London-Exeter and London-Edinburgh will be joy-rides compared to what has been done out here."

[The times given refer to the single journey in each case. This is made quite clear in the text.—ED.]

Sapper F. Douglas.

NEWS FROM SALONICA.

AN R.E. D.R. informs us that, as riders have been unable to procure new machines for some time, the sight of a brand new Sunbeam in the hands of an extremely incompetent Greek D.R. filled their breasts with a cold fury against such wanton waste.

AMERICAN TANKS ON THE LORRAINE FRONT.

MORE than 100 Tanks, manned by the Americans, aided in smashing the powerful concreted Boche first line, says the Exchange correspondent. The Tanks crossed the Boche line behind a dense smoke screen. Many of the prisoners are men from the crack 10th Division, which took part in the German Marne offensive of July.

VACANCIES FOR DISCHARGED OFFICERS.

THE Boys' Welfare Section of the Ministry of Munitions has vacancies for welfare supervisors in munition factories. Of the 150 supervisors appointed during the past year, a large proportion are officers discharged from the Army as unfit for further active service. All information can be obtained from the Ministry of Munitions (Boys' Welfare Section), Whitehall Gardens, London, S.W.1.

AN AMERICAN SOLDIER'S LETTER.

AN American soldier writes: "We have some very nice midnight rides, some lovely hill-climbs, secret time runs, and with all the variations of mud, darkness, Boche, and bullets. In our shops here we get the remains. It would make a dead man laugh at the attempts of these would-be professional teamsters. Ditches and trees have a most wonderful attraction for the machines, especially sidecars. The results are preposterous."

AN EXPLOIT WITH AN ABANDONED TANK.

THE D.C.M. has been awarded to Sgt. A. W. Golden, M.M. (who has since died from wounds), and Pte. J. Henham, for a dashing exploit with an abandoned tank. During an enemy attack, Sgt. Golden, together with Pte. Henham and another Lewis gunner, jumped into the tank, started the engine, and moved forward to the part where the enemy were thickest. They checked the advance, inflicted heavy casualties, and took fourteen prisoners.

FROM AN OLD COMPETITION RIDER.

W. J. CLARKE writes: "You will no doubt remember me doing the Six Days solo, also sidecar record, from 1912 to 1914, also the 3,000 miles A.C.U. trial during 1914. I have considerable trouble getting *The Motor Cycle* where I am stationed, but generally manage to get it in one place or another every week. As you know, we are riding P. and M.'s in the Royal Air Force, and it is marvellous what work they do, considering the awful roads and the horrible weather we are having. I do not think there is another machine that would stand the hard work the machines have to do. We get a lot of work and riding. I cover about a thousand miles weekly, and put in about seventy to eighty hours' riding a week, so you will know it is not an easy job out here. You will know I have been on some rough roads when I tell you I have been riding on roads we have only taken this last week; previous to this the Germans were on the same roads. I shall be more than pleased when it is all over, and look forward to the time when the riding competitions will start again, and as things are now I do not think it will be long."

Cpl. W. J. Clarke

The Single-track Passenger Machine.

Some Remarks on Pillion Seats.

ONE frequently hears in these days of bad roads that when the war is over their condition will severely handicap the sale of three-wheel runabouts of the Morgan type on account of the three tracks. It is also said that the sidecar, with its unsprung chassis and cycle frame, too, will be far from comfortable to ride, and that the only solution to the problem of the immediate future is a single-track machine.

Side-by-side seats on a Levis lightweight.

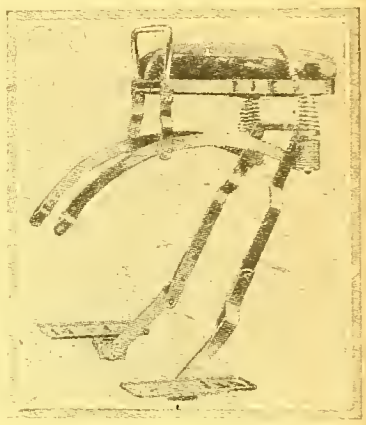
This, of course, is gross exaggeration, but it is interesting to know that in America, where the roads are notoriously bad, there are more machines used with a pillion seat than with sidecars, while outside the cities the three-wheel runabout is unknown.

In England there is a great prejudice against carrying a passenger on the carrier, and one can well understand this when the pillion passenger is of the flapper type accommodated on an old cushion, with no other provision made for her comfort. It is the promiscuous use of the carrier for passenger carrying that is to be condemned, and, provided the machine is suitably tyred and proper accommodation provided for the passenger, there is no reason why the single-track machine should not be used safely if the driver is content with moderate speeds.

A four-seated single track machine with side-by-side seats for two adults and accommodation for two juveniles at the rear.

Probably the greatest danger with carrying a passenger on the carrier lies in the use of machines with small tyres. A tyre designed for a certain load cannot be expected to stand up to its work when carrying nearly double the weight. If a rear tyre bursts at speed it is an unpleasant experience at the best of times, but with extra weight over the back wheel one contemplates the results with trepidation. The prejudice existing at the present time has been brought about solely through the misbehaviour of a type of joy rider whose great fault was his exuberant youth. But, if sensibly used, the pillion seat can be made a very convenient method of carrying a passenger.

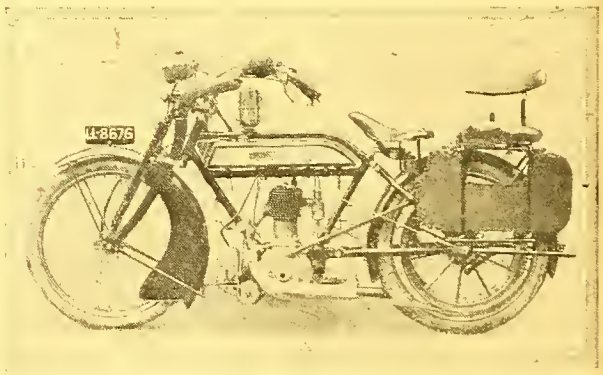
Both in America and in this country side by side seats have been arranged on a single tracker, and one of the illustrations shows a Levis lightweight which, it is said, was quite satisfactory as a single-track passenger machine. Probably higher powers than 2½ are to be recommended if two persons are to be so carried, but, what is more important, larger tyres must be fitted.



An American tandem seat with foot-plates.

As will be seen from one of the other illustrations, as many as four persons have been accommodated on a single-track machine. It is, perhaps, needless to say that this particular machine emanates from America. Nevertheless, this family is not the only party who take their motor cycling in this way, and one should hesitate before openly ridiculing.

No doubt the most general method of accommodating a passenger on a single-track machine is, and will continue to be, by the pillion seat and tandem saddle.



A 3½ h.p. with pillion seat.

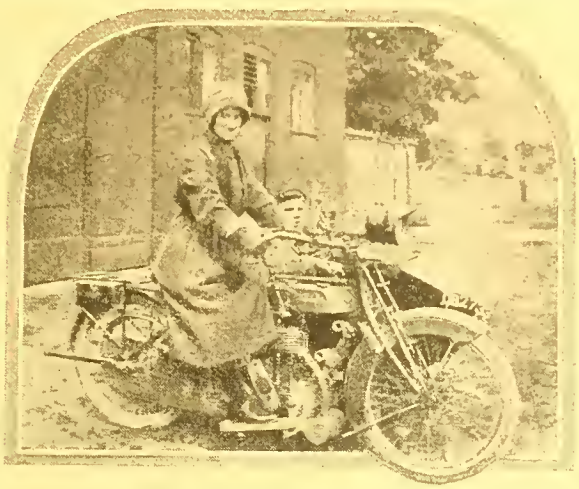
Both of these have their advantages; the latter undoubtedly is the better, as the extra weight is centralised, but the passenger of the fair sex probably will prefer the seat upon which it is possible to sit with all the greatest possible grace. The lady astride on a tandem seat or saddle does not look "nice," and, to the man in the street, the accommodation is never more than a temporary means of transportation. On the other hand, the well constructed pillion seat with proper dressguard is more permanent, and the passenger appears to be as much a part of the outfit as does the driver.

FREELANCE.

"CHARITY CORNER."

The "Damsel-in-Distress" Turn an Unqualified Success.

THERE is a certain windy corner of a small Norfolk town that I have christened Charity Corner. It is cold enough to deserve its name, but it holds a warm place in my heart for reasons which I will record, though I cannot give its name lest all belated motorists should contrive to push or pull themselves there somehow, until my name was cursed on Charity Corner.



"A small nephew was my passenger."

A small nephew was my passenger, and we had just indulged in a hearty lunch, costing 5½d., leaving Sunbeam outside. She had been running excellently all the morning, and there was no reason to suspect that she was harbouring evil designs against us. Perhaps she was annoyed that Lord Rhondda did not regard her as a manual labourer and increase her ration; perhaps she had become a conscientious objector; anyway, she firmly refused to start when we were ready to go. I kicked in vain, collecting the usual crowd of small boys and loiterers, who seem to regard an immovable motor bicycle as a free show sent by a kind Providence to cheer them in war-time.

"Go!" I said.

"I will not go," said Sunbeam.

"You must go," I said. (I also said other things, but *The Motor Cycle* would not print them.)

"I'll never go again," said Sunbeam, and with that she put her kick-start down and would not take it up again. My small nephew danced with glee. He had never been out in the sidecar before, and the prospect of seeing Auntie benighted was too much for him. With any luck he might miss a morning's school next day.

This was a mishap that had never occurred to me before, and I was at a loss how to meet it. "Tracing Trouble" gave me no clue. I changed gear, kicked, shook, and pushed, with no result. It remained fixed.

"Shall I go and engage two rooms at the hotel, Auntie?" was Michael's hopeful suggestion. "You will never make it go, you know: you do not know how." This was painfully true, but I could not allow it to pass.

"Nonsense, child," I said; "of course, we will get it done," but I knew that Blanktown only possessed 1,500 inhabitants at the best of times, and that any mechanic it had ever had would have "joined the war" long ago.

"We noted the address carefully and pushed off."

However, we scattered the crowd and pushed to a building bearing the word "garage" in large letters. A man in a car was just coming out, but by planting myself firmly in the middle of the gateway I was able to stay his progress while I asked him of his skill with motor bicycles.

Yes, he said, he could have done it, but he had to take the car out and he was half an hour late as it was. No, he would not be back till very late, and he could not possibly stay now. I might try Smith and Jones in High Street; they sometimes did repairs; and disregarding my presence, he whipped up his Ford and was off, nearly running over my toes.

We pushed on to Smith and Jones, a small cycle shop, with a modest sign informing us that cycles, motor cycles, and perambulators were repaired there. The cycles and perambulators were well to the fore, but, except for an invitation to purchase Shell motor spirit, of which I could not unfortunately avail myself, the motor cycle business seemed conspicuous by its absence. A small boy undertook to fetch the "boss." After an interval the man appeared—badly crippled unfortunately, which did not seem a hopeful augury for dealing with a kick-start. He was a delightful creature, full of sympathy and kindness. He produced a hammer and also shook, pushed, and knocked. Then he informed me that the last train home left at 6.30.

"But I cannot go home and leave it here," I said. "Cannot you do anything?"

"If I did anything, Miss, I would not be able to do anything," was his cryptic answer, but when he added, "I could never make it go, and it is better that you should know it." I fathomed his meaning.

It certainly was better that I should know, and I liked him the better for his frank admission of incompetence: but the night at the inn loomed horribly nearer. But what my friend lacked in mechanical skill he made up in ingenuity.

"I know what I should do if I were you, Miss. I should go to the Commanding Officer of the —th Loamshires: they have a lot of machines, and I dare say he would lend a soldier or two

"Charity Corner."—

to a lady." He spoke as if they were spanners or spare tyres.

The idea seemed a good one. I had never before consciously done the damsel-in-distress turn, but one cannot stick at trifles in war-time I rubbed the dirt off my face as much as possible and put Michael's collar outside his coat to make him look like an orphan. We noted the address carefully, and pushed off.

At last we reached the headquarters of the —th Loamshires—an untidy yard, surrounded on three sides by somewhat battered sheds.

A tall depressed-looking private came out of one of the sheds as I approached.

"Excuse me, but could you tell me where I should find the C.O.?" I asked politely

"Wotcher want 'im for?"

I explained, working my hardest at the damsel-in-distress turn. I felt that a private would be less stony-hearted than a C.O. My hopes were more than justified.

"Lemme see," he muttered, walking quickly to where Michael and Sunbeam were occupying the middle of the road. He pulled and pushed and shook (I was getting tired of this ritual). Then he produced a long screwdriver and lay down in the road. My spirits rose; no one had done this before. After a few minutes he got up, re-entered the shed, and returned, bringing with him a cheerful Scotch sergeant and a very young private.

In the twinkling of an eye they were upon it, talking unintelligible things about rockets, or rackets, or sprockets, while Michael and I retired to the yard to turn out our pockets to see what change we had to reward so much kindness and skill. We scraped up ten shillings between us, and rejoined the group on the high road. I do not know what they did, and I am quite sure that I could never do it myself, but it was gloriously successful, and within half an hour the youngest private was spinning down the road on a rejuvenated Sunbeam. The cheerful sergeant disappeared, and our depressed friend looked on in silence while Michael and I uttered ecstatic exclamations. I sought out the cheerful sergeant, and unearthed him in the furthest depths of one of the sheds, leaving Michael to deal with the youngest private. A few moments later we met in the yard, saying simultaneously, "Why he won't take it." Anyway, that left a really substantial tip for our gloomy friend, who, after all, had done most of the work. With blushing and stammers we offered him the money, intimating that he and his good deeds were far above rubies, but that was all we had. He waved it aside, as embarrassed as ourselves, and muttering something about it all being in the day's work, he disappeared beyond recall.

Sunbeam ran home as she had never run before.

That is Charity Corner, and that is why the name of the town is known only to me and Michael.

Anyway, I hope they enjoyed the box of cigarettes that reached them next day. E.J.

The exhibit of Abingdon Ecco, Ltd., makers of the King Dick motor cycles, on the Birmingham "Win-the-War" Day. It consisted of a motor cycle, twin and single engines, and various accessories. The photograph shows the lorry with a bulldog, the firm's trade mark, seated on the radiator

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

ADULTERATION.

Sir,—Why does not the Government seek to discover and prosecute sellers of petrol who adulterate their petrol with the troublesome element of paraffin, since they seek to discover and prosecute sellers of milk who adulterate their milk with the harmless element of water?

What is the readiest way to prove adulteration of petrol by paraffin? ANTI-ADULTERATION.

Melness.

THE CHARM OF THE FOUR-CYLINDER.

Sir,—I must draw your attention to the failing memory of my dear old friend "Ixion," and trust that this is only a temporary trouble due to the war or the rations and *not* a sign of age creeping upon him! In your issue of September 12th, and on page 231, he says that I was "observer" on a four-cylinder Dürkopp, and that a Hun drove me! I object. I was the *pilot* of that Dürkopp, and it was a solo four-cylinder motor bicycle. The Hun drove a Dürkopp twin of 6 or 7 h.p. with a sidecar. I ran mine in both London to Edinburgh and the End-to-end events, and broke up in the Grampians in the latter event, *all* my connecting rods coming through the crank case and *all* my pistons out of the top of the cylinders. It returned to London in packing cases!

Give "Ixion" my kind regards, please, and let me know when he is convalescent. A. C. WRIGHT.

THE LUXURY TAX ON MOTOR VEHICLES.

Sir,—The taxing of motor vehicles for the purpose of increasing revenue, whether as a luxury or under any other pretence, is fundamentally wrong, and calculated to have an effect opposite to that intended.

Revenue is dependent upon the prosperity of the community, and prosperity is in turn dependent upon productiveness, economical and speedy productiveness, and distribution: therefore every effort should be made by our legislators to encourage and facilitate manufacture, particularly the manufacture of essentials, with which must be included those things which in themselves increase output.

To increase productiveness, speed of communication must be increased, and no suggestion which, if carried into effect, would tend to cramp movement or limit energy, should be entertained, and yet apparently such a one is in all seriousness being considered.

It is proposed to create stagnation in the arteries of the country, to hinder the circulation of the life blood upon which its commercial health and energy depend.

To curtail means of transport, or to increase their cost, is to strike at the vitals of progress and successful business.

The slogan "Ships and still more ships" is a good one. We must have ships; they are the one necessity, without which England's prosperity must fade and her people die. Why do not our revenue raisers put an embargo upon their production in the shape of a tax? Because the idea is an absurdity, of course, being wrong in principle. Fortunately, this is realised, as is also the vital importance to us of "the freedom of the seas"; but, and here is tragedy indeed, it is *not* realised that the "freedom of the roads" is perhaps equally important, as, unless ships' cargoes are discharged and speedily distributed, unless they can be again quickly fed with the produce of our factories, the "freedom of the seas" and the multiplicity of our ships are negatived. Have there not been thousands of tons of foodstuffs—sufficient to feed towns—left to rot, been wasted, and destroyed, for lack of distributive facilities? The "freedom of the roads" is as essential to prosperity as the "freedom of the seas." The multiplying of land ships is equally vital, but our legislators are asleep to it, and are considering the limitation of output by taxation; incredible as it may seem, and iniquitous as it is, it can only be attributed to short sighted ignorance of the greatest needs of the country.

No; means of communication must be increased, distribution and transit of men and material must be speeded up. The business *brains* of the country must be vitalised, and their output increased, by facilitating intercommunication; no obstacle must be placed in the way of the independent and speedy movement of business men.

A suggestion for the reinstatement of the mediæval toll-gate, blocking the road to every shire and borough, might truly be attributed to insanity, and would not be tolerated, yet a movement which will not only have a similar effect, but, in addition, will cripple the great industry which saved the world from the Hun, is actually being entertained, and British-made motors must be taxed approximately 17% as luxuries, in addition to their present burdens.

It would possibly pay the nation better to subsidise the manufacturer, for *to slow or reduce means of transit is to reduce* the volume of business and revenue.

No; the machinery of our commerce must not be taxed, and the old trade union policy of limitation of output, with its resulting inflation of cost, must not, either directly or indirectly, be permitted.

The war must be paid for, certainly, but shall *we* pay by weakening our commercial standing (the proposed tax will have this effect, for modern methods demand the economical speed of the motor), or shall the Hun pay for his sin? He has coal and ore enough and to spare.

JAS. L. NORTON.

A SLIPPING BELT.

Sir,—In your issue of September 5th I noticed under "Current Chat" some tips for Rookies, and think the following may prove a useful addition.

A month ago, while riding my chain-cum-belt combination, on approaching a rise the engine raced on merrily, but the machine stood still. As it was dry weather, I put it down to clutch slipping, and spent nearly an hour trying to put this right. I then looked at the belt, and found that there was so much fine dust on it, and it was not very tight, that it was the cause of the trouble.

I am more or less of a Rookie myself, and do not think many other Rookies realise that a loose belt can slip horribly in dry weather as well as when wet.

W. ROEMMELE (CAPT.).

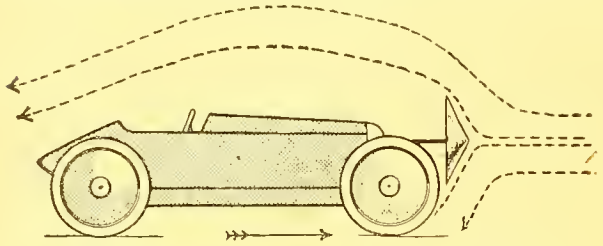
A SIMPLE AND INEXPENSIVE MOTOR CYCLE FOR THE PEACEFUL POTTERER.

Sir,—Your issue of September 5th contained some interesting notes and sketches of lighter lightweights. The 1913 Levisette appealed to me, and I suggest the following modifications for a 1919 model: Chain drive from the engine shaft to the cycle chain ring—this to contain a Sunbeam bicycle type of two-speed gear strengthened; final drive *à la* bicycle; no free wheel, of course, but the hub to contain a helical spring through which the drive passes from the chain ring to the hub of the wheel (a device of this nature to cushion shock and get over the "dead centre" was patented for bicycles some ten years ago); magneto on crankshaft; cylinder and upper crank case cast in one (*à la* Allon); mudguard *not* designed to drop mud on to the rear chain (usual practice!); stand *not* designed to wear out in six months (the Rudge is perfect); the finish should be all black. ALLON.

Sheffield.

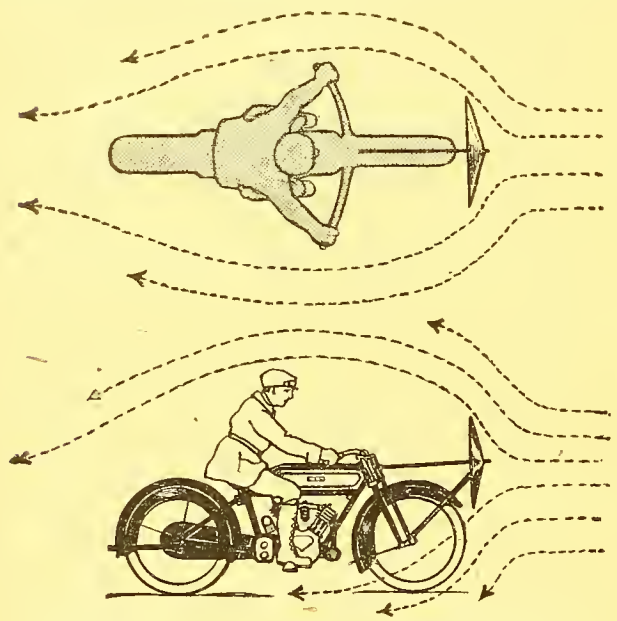
STREAMLINING A MOTOR CYCLE.

Sir,—I notice in *The Motor Cycle* that Mr. E. F. Burdett wants to see a streamline motor cycle. A French engineer, M. Constantin, has increased the speed of a light car by



The streamlining for a cycle car, as suggested by M. Henri Boursiac.

8%, and its general efficiency by 20%, by fitting in front of the car a simple aluminium cone. A plain flat disc gave better results. I noticed this in the journal *La Science et la Vie* of November, 1917, in an article dealing with air



Streamlining effect for a motor bicycle. (See accompanying letter.)

resistance, in which was reproduced a picture of a streamline sidecar, which was mentioned as having appeared in *The Motor Cycle* of July 19th. Could not this idea be easily carried out on a motor cycle? It would apparently be quite simple to carry out the experiment.

Cherbourg. HENRI BOURSIAC.

MOTOR CYCLISTS AND THE R.A.F.

Sir,—I have followed the correspondence *re* above in your paper with great interest, and anyone who really knows, must admit that we—the motor cyclists—are treated very badly by being termed non-technical, and paid at the rate of only 1s. 6d. per day.

The men who say we do not have our running repairs to attend to, either know nothing about it or have struck some soft jobs far from the danger zone.

Take my case. I was sent direct from Blighty to an advanced Balloon Section in France, where the motor cyclist's is undoubtedly the most dangerous job. His work lies over roads—more often than not over mere tracks—full of shell holes, congested with traffic, and under direct enemy shell fire. He is allowed no lights at night, has to do his own repairs (our workshop lorry often being eight or ten miles behind us), and for all this we are classed non-technical, and given the lowest rank there is, *i.e.*, second-class privates.

There are men here whose principal work appears to be to hang on to balloon ropes and assist in lifting gas tubes about. This being a technical job, they are classed as second and third air-mechanics, with pay of 3s. or 2s. per day. Now, is it fair or just to the cyclist?

We have heard of the "consideration to be shown to the older and lower category men." I am forty-one, category C1, left wife, six children, and a good business. The "consideration" I get is to be sent direct to the most forward section of the R.A.F. J.C.P., R.A.F.

B.E.F.

TANGENTS OF OBSERVATION.

Sir,—In reply to Mr. John Holland and "Curious." it may interest them to know that the horizon does not by any means increase in direct proportion to the vertical height. In other words, the distance to the horizon at, say, 6ft. vertical height is not doubled if the vertical height is increased to 12ft. If my memory is right, the correct formula for use to discover the horizon is to add 50% to the vertical height in feet, find the square root, subtract one-seventh for refraction, and the result is the radius of vision in statute miles at the water's edge.

BATTMAN SCOTT (Aircraft Motor Designer).

Sir,—Re enquiry of "Curious" on page 268 in your issue of September 19th, as to distance the human eye can see, I cannot quote the professor's name who gave the particulars, as I have mislaid the notes; but he said that the human eye, when in perfect condition, could see eighty miles under the best conditions of atmosphere, and distinguish objects—that is to say, a large building from a collection of trees.

Apart from this, it is an established fact that Everest can be seen from Darjeeling on a clear day, a distance of one hundred miles; and even in this part of the world Ben Lomond can be seen from Forth Bridge, which is fifty miles. The distance to be seen from the top of Snowdon on a clear day is seventy-three miles.

With regard to previous letter on "Refraction," refraction differs with temperature and pressure (barometer), but tables are given for mean refraction—that is to say, when the temperature is 50° and pressure 29.6in. Also Professor Bessel, of Königsberg, constructed a table, known as Bessel's refractions, which are considered to be very accurate, and which no doubt can be seen in a reference library.

Edinburgh. NOT YET AN AVIATOR.

FLAT.

Sir,—Your correspondent "Ixion" complains that things are "flat." Well, to quote a redoubtable champion of liberty, "Lay spears about the ruddy ox, for we return once more."

A propos his remarks *re* gear boxes, why buy the offending makes? There is at least one gear box on a well-known single into which one can "plug the lubricant in lumps." And although the maker's business methods are anathema to me, one must give even the devil his due, although the lubrication advantage is outweighed by a mechanical disadvantage.

My gear box on an English twin (the third of the same make) has never given me any trouble, and I can pour in thick engine oil straight from the tin if I have not been out too late the night before. S. J. LAYZELL.

PETROLEUM RESEARCH.

Sir,—In several articles which have appeared recently in the press in reference to the recommendations of the Petroleum Research Department enquiry has been made as to why the recommendations of the Department were not carried out. In view of this, may I draw your attention to the report of Lord Crewe's Committee, and especially to the summary of its conclusions, which is as follows:

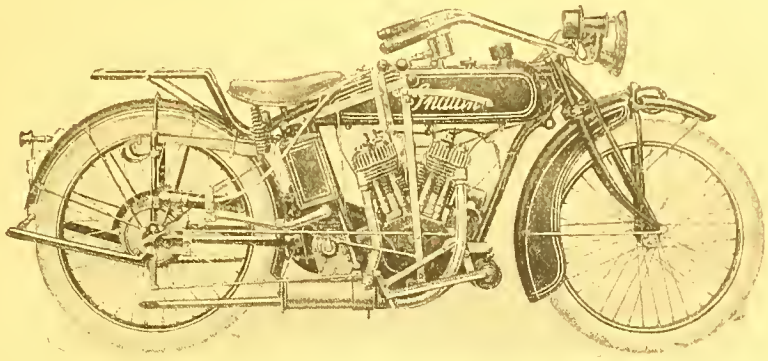
1. That the scheme for the carbonisation of cannel coal and kindred substances recommended in the petroleum Research Department's Report was not a practicable one, and that the Ministry of Munitions were justified in declining to embark on it.

2. That the alternative policy of developing the production of fuel oil from cannel coal and kindred substances in existing vertical retorts at gasworks should be developed within the limits indicated in this report.

That the decision of the Ministry of Munitions to erect a battery of the Chiswick form of retorts was the right course to adopt in the circumstances.

D. CAIRD, Ministry of Munitions.

We regret that we are not in a position to supply motor cycles at the present time. But we can send a 1918 descriptive list on application. *This applies to Great Britain only.*



HENDEE MANUFACTURING Co.,
"Indian House," 366-368, Euston Rd., London, N.W.
Telephone: Museum 1611.
Telegrams: "Hendiun, Euston, London."
AUSTRALIA—109-113, Russell St., Melbourne.
CANADIAN WORKS—12-14, Mercer St., Toronto.
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 579, West St., Durban; Indian House, Strand St., Port Elizabeth.

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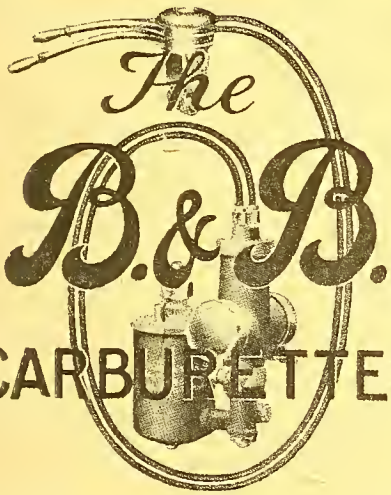

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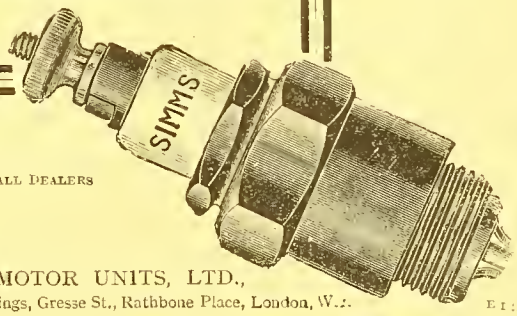

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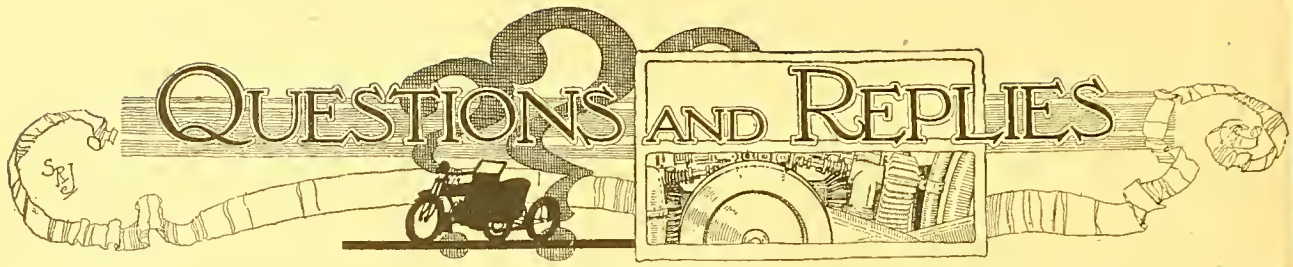

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Licence Rebate.

On Saturday, August 3rd, I asked for a motor licence for 1918 at the local G.P.O., and I had to pay £1 instead of 10s., as, I think, it ought to be after August 1st. Please be so good as to tell me how I can get repaid the 10s. I also had to pay the full rate for my motor insurance at Lloyds. —J. DER A.

The rebate of 10s. on local taxation licences is not made until October 1st; consequently you cannot claim for the refund of 10s., as you suggest. The insurance, we think you will find, runs for twelve months from the date of issue

To Find the Compression.

I shall be obliged if you can give me the following information: (1.) Given the piston displacement in c.c. and the combustion space in c.c., what is the working to find the compression in lb. per square inch? I wish your excellent paper every success. I have gained much useful information from it, and consider it indispensable to the movement.—R.J.B.

Compression in lb. per square inch is obtained roughly by multiplying the number of times the combustion space divides into itself plus piston displacement by 14.7.

Two-stroke Decarbonising.

I am the possessor of a 1914 two-stroke Triumph. It has been running well for about two years. The other day it developed a knocking noise, which—unless I slowed down—increased until the motor bicycle stopped, when (if started again) it would run for another mile or so, then the knocking would start again. I took the piston and cylinder off, and carefully removed all carbon, and replaced them. The timing is correct, but the compression seems a trifle weak, and as the rings are tight and the joints good I can detect no leak.—C.R.St.J.R.

From the symptoms you describe it is difficult to say at all definitely what might be causing your trouble. However, any one of the following might account for it: (1.) Cracked piston. (2.) Failure to clean out thoroughly the exhaust and transfer parts when the engine was decarbonised. It is most important that these parts should be kept clean in any two-stroke engine. (3.) An unsuitable plug would cause pre-ignition. The type of plug you require is one having short electrodes.

Free Engine with N.S.U. Gear.

I have a 4 h.p. Triumph combination with N.S.U. two-speed and free engine gear, which operates from the handle on the top tube. Is it possible to place a kick starter or any other arrangement for starting with a sidecar?—H.H.

There is no objection to your fitting pedals and ordinary pedalling gear driving the back wheel. This would enable you to start the engine while the machine is on the stand by means of pedalling, and then placing the gear lever in the neutral position you could lower the machine off the stand and start away by gradually letting in the clutch. With this gear it is impossible to start without raising the rear wheel off the ground.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

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Clutch Trouble.

I have a 3½ h.p. 1913 free engine Triumph, but for a time it has not been running as it should. My troubles are as follow: (1.) The engine starts all right and the clutch acts perfectly when the machine is on the stand, but immediately I take it off the stand, mount, and let the clutch in the engine stops. I have thoroughly cleaned out the free engine hub and oiled it. (2.) Sometimes the machine will run for quite a spell without a hitch, and then suddenly it will slow and pick up again. This very often happens on hills. At first I thought it was a choked jet, but I found out that this was not the cause of the trouble.—E.F.

We do not think the trouble is due to the clutch in any way, but to a falling off of power in the engine, which might be caused by a number of things. It might be caused by air leaks at the carburetter or induction pipe unions, preventing the engine from developing power at slow speeds, or it might be due to a valve sticking in its guide. Of course, you are probably aware that all single-geared machines start from stand still by means of the clutch with difficulty, as otherwise the gear would be too low for ordinary purposes.

An Electrical Motor Cycle.

In your issue of June 6th you gave a description of an electric motor cycle. Can you please tell me: (1.) What electrical horse-power would be required to drive the cycle with sidecar and two people at reasonable speed? (2.) What power (in electrical units) would the accumulators have to be? (3.) Can you give me a rough estimate of the cost of such machine (initial outlay)? (4.) I should also like to know if it is lawful for me to use a taxi to take a wedding party to church.—W.J.J.

(1.) About four. (2.) This depends on the type of motor employed and running time desired. (3.) Should be slightly more than petrol cycle of same h.p. (4.) Yes, provided it is a *public* hire vehicle and does not proceed beyond the three miles limit outside the area in which it is registered.

RECOMMENDED ROUTES.

CAERPHILLY TO WHALEYBRIDGE.—W.H.G.

Caerphilly, Newport, Chepstow, Monmouth, Ross, Ledbury, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Market Drayton, Nantwich, Crewe, Sandbach, Congleton, Macclesfield, Whaleybridge.

MENAI BRIDGE TO PLYMOUTH.—G.R.J.

Menai Bridge, Bangor, Capel Curig, Bettws-y-coed, Cerrig-y-Drnidion, Corwen, Llangollen, Chirk, Shrewsbury, Bridgnorth, Kidderminster, Worcester, Tewkesbury, Gloucester, Bristol, Cross, Bridgwater, Taunton, Wellington, Cullompton, Exeter, Chudleigh, Ashburton, South Brent, Ivybridge, Plymouth.

The foregoing is the main road. You can make many changes in Wales, depending upon what places you wish to visit, *e.g.*, you might go *viâ* Carnarvon, Beddgelert, Maentwrog, Dolgelly, Machynlleth, Cemmaes Road, Carno, Caersws, Llanidloes, Llangurig, Rhayader, Builth Wells, Talgarth, Crickhowel, Abergavenny, Raglan, Monmouth, Coleford, Little Dean, Gloucester.

From Gloucester the pleasantest ride is through Stroud, Bath, Wells, and Glastonbury.

From Exeter it is a fine run over Dartmoor *viâ* Moretonhampstead, Two Bridges, Princetown, Plymouth.

MOTOR CYCLES FOR SALE.

Indian.

7-9h.p. Indian and Sidecar, complete, electric lighting, stored owing to war; £55.—Lieut. Knowles, Atlantic House, Holborn Viaduct. [8491

INDIAN 7-9h.p. Powerplus Combination, 3-speed, kick start, hand and foot clutch, as new; 65 gns.—619, Garrett Lane, Earlsfield, S.W.18. [8474

4h.p. Indian, 2-speed, new tyres, very fast machine, £25, or exchange good lightweight; sidecar, good order, £3/10; Hedstrom carburetter, 12/6; P.U. lamp set, 25/-; extra heavy Dunlop cover, 26×2½×2¼, 30/-; new lightweight handle-bars, 7/6; two new extra heavy Coventry chains, ½×3-16, 15/- each.—R. Mugleston, Stanleigh Rd., Overseal, near Ashby-de-la-Zouch. [X8363

Ixion.

1914 Ixion, 2¾h.p., 2-stroke; bargain, £15.—86, High Rd., Lee. [8530

James.

JAMES, 1916, 4½h.p., 3-speed, James canoelet sidecar, Lucas dynamo lighting outfit, 85 gns.; James 1916 3½h.p. twin, 3-speed, T.T. bars, hand clutch, 48 gns.; James 1915 3½h.p. twin, 3-speed, hand clutch, kick start, T.T. bars, 45 gns.; James 1914 4¼h.p., 3-speed, canoelet combination, 48 gns.; James 1914 4¼h.p., 3-speed, renovated, 36 gns.; James 1914 4¼h.p., single speed, renovated, 28 gns.; James, 1917, 2-speed, 2-stroke, as new, 35 gns.; James, 1918, new 5-6h.p. twin, 3-speed, £84; also early delivery other new James models.—Rider Troward and Co., 31, 40b, and 78, High St., Hampstead. 'Phone: 5392 Hampstead. [8622

Juno.

1915 Juno, 2¾h.p., 2-speed; genuine bargain, £22.—86, High Rd., Lee. [8533

Kerry

1914 Kerry-Abingdon Combination, 3½h.p., 3-speed, very fast; £40.—86, High Rd., Lee. [8531

KERRY-ABINGDON, King Dick engine, F.E., 2-speed, 3½h.p., running order; £17.—Lt. Richards, Reserve Stores, Faversham, Kent [8460

Levis.

LEVIS, single gear, popular model, nice condition; £22.—86, High Rd., Lee. [8532

BABY Levis, perfect order; £25, no offers; any trial.—Taylor, Capel, Ipswich. (D) [X8246

LEVIS, 1915 model, 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

LEVIS, 1917 model, new machine, slightly shop-soiled, 2¼h.p., 2-speed gear; £45.—Hopkins, New St., Ledbury. [X7263

L.M.C.

L.M.C., 3½h.p., 1914, 2-speed and free engine, handle starting, coachbuilt carrier, fitted tray, as new running; £30.—53, Duncombe Rd., N.19. 'Phone: 1017 Hornsey. [8497

Matchless.

MATCHLESS, 8h.p., enclosed Bosch, Amac, very fast; £35.—619, Garrett Lane, Earlsfield, S.W.18. [8476

1918 Matchless Combination, super model, M.A.G. engine, hood and screen, spare wheel; £130.—Ross, 86, High Rd., Lee. [8534

MATCHLESS Combination, 2-speed, clutch, speedometer; cheap for cash, £37.—Liddle, 5, Wickwood St., Gordon Grove, Camberwell, S.E.5. [8542

MATCHLESS, 1914, 8h.p., countershaft, clutch, kick, underslung sidecar, accessories, smart, powerful; £65, offer; exchange. 24, Beauval Rd., East Dulwich. [8585

MATCHLESS 8h.p. J.A.P. Cambination, screen, large hood, luggage lock-up, excellent condition throughout; £75; seen by appointment.—Oakley, 95, Fowlers Walk, Ealing. [8473

MATCHLESS War Model Combination, with spare wheel and tyre; £125; trade enquiry entertained; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [X7986

MATCHLESS 8h.p. M.A.G. Combination, delivered August, 1917, not done 200 miles, nearly £40 worth of accessories; £164.—Maudes', 100, Gt. Portland St., London, W.1. [8596

MATCHLESS 1914 Combination, J.A.P. engine, £75; absolutely new combination from stock, £125; extended payments or exchange.—Service Co., 292, High Holborn, London. [8448

MATCHLESS 1918 War Model, spare wheel, combination electric light set, in perfect condition; any trial; £118, or very near offer; must sell.—Bruce Wood, Horn Park Farm, Lee, S.E.12. [8512

MATCHLESS.—Early deliveries of 8h.p. J.A.P. war model combination, spare wheel; £125; exchanges arranged. Now booking post-war deliveries.—Maudes', 100, Gt. Portland St., London, W.1. [7737

MATCHLESS, 1914, 8-10h.p. J.A.P., Binks, Bosch, 2-speed, coachbuilt sidecar, screen, grid, lamps, accessories, spares, excellent order; £40, or part exchange light car.—Hutcheson, Westcott, Beauly. [X8249

1915 Matchless, 8h.p. M.A.G. engine, lamps, speedometer, spring seat-pillar, double seater sidecar, good tyres, and spare; £65; seen by appointment.—Chick, 9, Bonneville Gardens, Clapham Park, S.W.4. [8553

OFFERS WANTED

This may be your last chance before we leave these premises. They are taken for Munitions, and a prompt Clearance of Stock is imperative. Cash offers or Exchanges wanted. WRITE NOW.

1916 8 h.p. **ENFIELD** Combination, and accessories. One off the best	£82 10
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1914 7-9 h.p. spring-frame **INDIAN,** 2 speeds, Millford coach Sidecar	£49 10
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1913 2¾ h.p. **DIAMOND,** 2-speed, shaft and chain drive, very fast machine	£25 10
CHATER-LEA, 8 h.p., 3-speed countershaft, chain drive, very smart 2-seater coach Sidecar, hood, screen, accessories	£62 10
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Motor Cycle Stands, 3/-; Carriers	3/-
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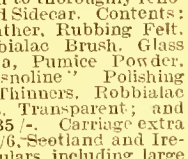

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Matchless.

MATCHLESS Combination, 1913, just delivered from works, 8h.p. M.A.G. engine, finished private colour, hood and screen, all Lucas accessories, complete spare wheel, interchangeable, 700-80 tyres, 3-speed gear box; £160.—Short, 485, Upper Richmond Rd., E. t Sheen. [8497

MATCHLESS 1916 Combination, 8h.p. M.A.G. engine, double seated coachbuilt sidecar, 2 wind screens, Lucas dynamo lighting set, electric horn, speedometer, etc., everything perfect; owner in service; accept £95, or nearest offer.—Lawton, 32, Lord St., Rodcar, Yorks. [X8390

MATCHLESS 8h.p. Combination, 3B2, left works June, 1917, mileage 750, M.A.G. engine, E.R.S. accumulator lighting set never been used), 3 wheels only, all Palmer light car size, spring wheel on sidecar, luggage grid, complete set tools; what offers?—Further particulars and offers to Jas. Paul Ingersoll Watch Depot, 124 High St. Perth [X8243

Mead.

BARGAIN for First Comer.—1915 2-speed Mead-Precision lightweight, 120 m.p.g. climb anything, almost brand new condition, faultless; first £18 secures; approval.—77, Birkby Hall Rd. Huddersfield [8503

Motosacoche.

1916 Motosacoche, 2-speed Enfield gear, nice order; £35.—86, High Rd., Lee [8535

New Hudson.

NEW Hudson Coachbuilt Combination, 1914 carnout, 3½-4h.p., 3-speed, speedometer, lamps, etc.; £35.—1, Gunnersbury Lane, Acton. [8563

6h.p. New Hudson Combination, 1915, 20 gn. coachbuilt sidecar, 4-speed countershaft gear box, lamps and accessories, all in good condition, any reasonable trial; price £42, or would exchange Douglas.—Apply, P. F. Dudley, Cumberlow Green, Buntingford, Herts. [8267

New Imperial.

1915 Imperial-Jap, 2-speed, nice condition; £26.—86, High Rd., Lee. [8536

CROW Bros., Guildford.—New Imperial, all models, new and second-hand, in stock. [5371

NEW Imperial Motor Cycles.—2-speed, standard, and lady's models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0959

Norton.

1916-17 Big Four Norton Combination.—Oates, 5 Exley Av., Sheffield. [X8249

1915 Norton Combination, 4h.p., countershaft chain drive, lovely condition; £68.—Ross, 86, High Rd., Lee, S.E. [8537

1916 (late) T.T. Norton, 3½h.p., 3-speed, clutch, kick start, lamps, horn, speedometer, discs, foot boards, horn, knee-grips, very fast and sporting; £70.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

NORTON 3½h.p. T.T., 1916, Philipson, mechanical horn, Lucas lamps, spare belt, long exhaust pipe, speedometer, very fast; £60, lowest; any trial or stripped inspection at Lancaster.—Capt. Ellis, Dallas Rd. School, Lancaster. [X8239

N.S.U.

N.S.U., 2¾h.p., mag., etc.; £6/15.—230, Brixton Rd., S.W.2. [8606

N.S.U. 5-6h.p. twin, 2-speed, clutch, spare tank, B and B., Bosch, fast, £12; also Lucas carrier, 4 wheels, 8-10h.p., water-cooled, differential chain drive, 2-speed and reverse, make good cycle car, £20.—39, Balham New Rd., Balham [X8318

O.K.

O.K.'s, new and second-hand, in stock from 20 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [8449

Omega.

1914 Omega, 2-speed, low position; £22.—Ross, 86, High Rd., Lee. [8538

P. and M.

1912 P. and M., 3½h.p., 2-speed; real bargain, 20 gns.—86, High Rd., Lee [8539

P. and M. Motor Cycle, 2 speeds, lamps; bargain, £24. —H. V. Locke, Draper, Penge. [8612

P. and M. Combination, 6h.p., 90° twin, electric lights and horn, speedometer, horn, clock, luxurious sidecar, mirror, screen, very good condition; £100.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

Premier.

1915 Premier Combination (countershaft), 3½h.p., hood and screen; £50.—86, High Rd., Lee. [8540

3½h.p. Premier, 1912, 2-speed, guaranteed good order; trial given; £16.—113, Blair St., Poplar, E.14. [8576

1914 Premier, 3½h.p., 3-speed (re-enamelled and plated); £35; exchange 3h.p. Enfield, Rudge, or Matchless, cash adjustment.—Ross, 6, Glencoe Rd., Evesham, Worcestershire. [X8384

MOTOR CYCLES FOR SALE.

Quadrant.

1914 Quadrant, 3-speed, 3½h.p., good condition; £28, or near offer.—236, Ardgowan Rd., Catford, London. [8459

QUADRANT, 4¼h.p., 1913, 3-speed hub, complete with sidecar, hood, screen, and apron; £35; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [8429

Radco.

RADCO, 2¼h.p., 2 speeds, good condition; must sell —76, London St., Chertsey. [8555

RADCO, 1915 2-stroke, splendid condition, perfect order; owner gone away; £20.—L.A., 35, Mile End Rd., London, E. [8517

Rex.

REX, 6h.p., 2-speed, B. and B., Bosch, good order; exchange lighter machine, or sell £20.—Walker, Guildford Rd., Light Water, Bagshot. [8520

REX, 4h.p., mag., new spring forks, low drop seat, renovated as new 4 years ago, not used since; £10, no offers; after 7 o'clock.—Loveday, 29, Russell Rd., South Tottenham. [8550

Rover.

1914 Rover, 3½h.p., 3-speed, splendid order; £35.—Ross, 86, High Rd., Lee. [8541

1914 Rover and coachbuilt sidecar, 3-speed, clutch, kick start, new heavy Dunlop tyres and belt, 3 lamps, etc., splendid condition; 36 gns., or nearest.—104, Kingsway, Ponders End. [8599

ROVER Motor Cycles.—3½h.p. and 5-6h.p. models in stock for immediate delivery, both solo and sidecar outfit; trade supplied; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0954

Rudge.

1912 Rudge T.T., 3½h.p., good order; £16.—86, High Rd., Lee. [8542

1914 Rudge Multi, 3½h.p., very fast; bargain, £30.—86, High Rd., Lee. [8543

RUDGE Multi Combination, 1914, 3½h.p., excellent condition; bargain, £31/10.—S., 18, South Bruton Mews, Bond St., W. [8516

RUDGE Multi, 3½h.p., with Mills-Fulford De Luxe sidecar, nearly new; what offers? Also motor suit, new.—Heppenstall, 86, Boothferry Rd., Goole. [X8354

RUDGE 3½h.p., clutch, 1917, 2-speed, Albion countershaft gear, quick detachable coachbuilt sidecar; nearest offer £25, or exchange with cash for higher power twin.—84, Otber Rd., Redditch, Worcs. [X8242

FOR Sale, 3½h.p. Rudge Multi and wicker sidecar, bought new May, 1918, condition perfect, little used, owner having car and other motor bicycle; any trial; deposit; £70; full particulars; Ireland.—Box 2,278, c/o *The Motor Cycle*. [X8122

Scott.

SALE, late 1913 Scott and Montgomery coachbuilt sidecar, new tyres, speedometer, lamps, spares, splendid condition; what offers?—Verity, Craiglands, Grassington, Yorks. [X8369

Singer.

SINGER, 3½h.p., good condition; sacrifice 12 gns.; particulars, photo, stamp.—Evans, 10, Bodnant Av., Leicester. [8461

SINGER, late 1914, 4½h.p., 2-speed, C.S., clutch, coachbuilt sidecar, all accessories; £46.—50, Stopford Rd., Plaistow, E.13. [8586

1913 3½h.p. Singer, in perfect order, N.S.U. 2-speed, Morrison coachbuilt spring wheel sidecar, not used last three years; no reasonable offer refused.—Box 2,297, c/o *The Motor Cycle*. [X8238

Sunbeam.

SUNBEAM 1914 3½h.p. Combination, 3 speeds, kick start, coachbuilt sidecar; £64.—Maudes', 100, Gt. Portland St., London, W.1. [8594

1916 3½h.p. Sunbeam, black and gold finish, no sidecar, Bosch mag., perfect condition; £70.—Robinson's Garage, Green St., Cambridge. [8569

3½h.p. Sunbeam, late 1916, condition perfect, 3-speed, kick starter, lamps, and Klaxon; £60, or near offer.—Box L7,230, c/o *The Motor Cycle*. [8466

3½h.p. Sunbeam Combination, engine rebushed, new gears, Renold chain, and tyre, completely overhauled, mechanically perfect; £65.—302, Albany Rd., Camberwell. [X8105

3½h.p. 1914 Sunbeam, B. and B. carburetter, 3-speed countershaft, kick start, h.b.c., chain drive, coachbuilt Sunbeam-Gloria sidecar; stored 2 years; £60.—Cooper, 28, Meeting House Lane, Brighton. [8490

1916 3½h.p. Sunbeam, with Mills-Fulford sidecar, storm apron, 2 lamp sets, Watford speedometer, absolutely equal to new, scarcely ridden, black and gold finish, unscratched, exceptional condition throughout; £100.—Robinson's Garage, Green St., Cambridge. [8568

T.D.C.

1917 2¾h.p. De Luxe T.D.C., Dixie, Amac, footboards; £20; part exchange bicycle.—62, Clarendon St., Aston, Birmingham. [8472

THIS WEEK'S OFFER

ROVER, 3-speed, clutch, kick starter, latest model, absolutely new, engine never been started up since we received it from the makers. Price **£80**

Also the following NEW Machines, latest models, in stock, all of which can be supplied without permits.

NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed .. .. **44 gns.**
***LEVIS** Popular, 2-stroke .. **£32 0**
LEVIS, 2½ h.p., 2-speed .. **£47/10**
LEVIS, 2½ h.p., single-speed **37 gns.**
ROVER, T.T., Philipson pulley **£67/10**

SECOND-HAND MACHINES.

1917 **NEW IMPERIAL-J.A.P.,** 2½ h.p., 2-spced .. **35 gns.**
1917 **LEVIS** Popular, just overhauled by the makers **27 gns.**
1916 **ENFIELD,** 3 h.p., 2-sp. **42 gns.**
*Permit required for this machine.

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84, Broad Street,
READING.

Biggest Light Car and Motor Cycle Dealer in the South.
'Phone: 1024. Closed Wednesday 1.

MOTOR CYCLES FOR SALE.

Triumph.

1913 Triumph, 3-speed, excellent condition, very fast; £30.—86, High Rd., Lee. [8544

TRIUMPH and Sidecar; any trial; £14; photo, stamp.—Robinson, Sandy, Bedfordshire. [8558

1914 (Late) Trinmph, 4h.p., C.B. combination, all accessories; £45.—86, High Rd., Lee. [8545

1915 Baby Triumph, complete, lamps, etc., fine order; £37.—Cross, Jeweller, Rotherham. [X8393

TRIUMPH, 3½h.p., T.T., new tyre, belt, lamps, reliable solo machine; £24.—8, Slaithwaite Rd., West Bromwich. [X8379

T.T. Triumph, 1913, free engine, clutch, Philipson, excellent tyres; £24, offers.—Sunderland, North St., Lockwood, Huddersfield. [8488

1914 4h.p. Triumph, Chater sidecar, 3-speed, clutch, speedometer, hood, screen, 3 lamps, heavy tyres; £42.—29, Dalberg Rd., Brixton. [8553

TRIUMPH, 3½h.p., 1908, good running order, Bosch mag.; £15/10.—Apply, A. B. Charlton, Holbeach St. John's, near Holbeach, Lincs. [X8245

JUNIOR Trinmph, 1914, excellent condition; selling as owner recently purchased car; offers invited.—Box 2,298, c/o *The Motor Cycle*. [X8315

3h.p. Triumph, Bosch waterproof mag., tyres practically new, belt new, grand goer; £14.—W. Jones, 64, Rhosddu Rd., Wrexham. [X8352

1912 Triumph, free engine, clutch, heavy Dunlop front, heavy Bates back, fast, and in good condition; £25.—Box L7,248, c/o *The Motor Cycle*. [8509

1914 (late) Triumph and Sidecar, speedometer, horn, etc., 3-speed Sturmey-Archer, nearly new tyres, in splendid running order; £45 cash.—The George Inn, Bucklesbury, Hitchin. [8485

V.S.

1914 8h.p. V.S.-J.A.P., 2-speed, Millford underslung sidecar, full equipment, new tyres; £42; lower power part.—43, Kilmorie Rd., Forest Hill. [8560

Williamson.

8h.p. Williamson Combination, splendid condition; sell £65, or would take part exchange F.N. 4h.p., or good hammerless gun.—Gilbert Lodge Farm, Grimston, Lynn, Norfolk [X8319

Wolf.

1914 Wolf, 2¾h.p.; genuine bargain, £16.—86, High Rd., Lee. [8546

Zenith.

1912 Zenith, 3½h.p.; real bargain, £16.—86, High Rd., Lee. [8547

MOTOR CYCLES FOR SALE.

Zenith.

1914 Zenith Combination, 8h.p., K.S. and clutch condition; £45.—86, High Rd., Lee.

ZENITH, 1914, sidecar, new condition; £38 change.—24, Beauval Rd., East Dulwich.

1914 8h.p. Zenith Combination, countershaft, condition.—Wilson, Bramshill, Eversley, Ha

ZENITH, 3½h.p., 1915, clutch, kick starter, about 2,000 miles; £45.—The Holt, Gerrards [X

Ladies' Motor Cycles.

1915 Lady's Douglas, 2¾h.p., 3-speed, latest inset clutch, very low mileage, 2 lamp sets, all tools, etc., in perfect condition, like new; £57/ Robinson's Garage, Green St., Cambridge. [

Miscellaneous.

JAMES, 1915 2¼h.p., 2-stroke, 2 speeds, exce condition; £32.—See below.

JAMES, 1916, 2¼h.p., 2-stroke, 2 speeds, lamps, horn; £36.—See below.

JAMES, 1917, 2¼h.p., 2-stroke, 2 speeds, lamps horn; £40.—See below.

JAMES 1915 4¼h.p. Combination, 3 speeds, cl and kick-starter, all-chain drive; £60.—See be

BS.A. 1917 4¼h.p. Model K. Combination, light, tail lamp, horn, speedometer, and wa £73.

ROYAL Enfield, 1916, 6h.p., dynamo lighting set, tric horn, bulb horn, speedometer, etc.; £98.

ROYAL Enfield Combination, 1916, 6h.p., la horn, and speedometer; £78.—See below.

DOUGLAS, 1910, 2¾h.p., lamps and horn; £15.— below.

DOUGLAS Combination, 1915, 4h.p., Lucas la and horn, Stewart speedometer and warning sig £63.—See below.

ALLON, 1916, 2¾h.p., 2-stroke, excellent conditi £30.—See below.

CALTHORPE, 1915, 2¼h.p., 2-stroke, spe lamps, and horn; £27.—See below.

HARLEY-DAVIDSON, 1916, 7-9h.p., dynamo li ing model, speedometer, and canoelet sidecar;

TRIUMPH, 1913, 3½h.p., 2 speeds, and clu Gloria sidecar, head light, rear lamp, horn, sp ometer; £40.

TRIUMPH, 1910, 3½h.p., T.T. model, speedome £20.—See below.

PREMIER, 1913, 3½h.p., countershaft gear clutch, fitted with coachbuilt sidecar; £38.— below.

PREMIER, 1913, 3½h.p., and tradesman's side-car 3 speeds, clutch, and starter; £50.—See belo

LEVIS Popular, 1917, 2½h.p., Lucas lamp horn; £26.—See below.

ALL the above motor cycles are ready for imm ate delivery, and deferre payments can be ranged for any of them.—Write for further particu and list B. 22 to the Eastern Garage Co., 418, Romf Rd., Forest Gate, E.7. Telephone No.: East Ham 4 T.A.: Egaraco, London.

FOR Sale, 3½h.p. motor cycle, running order, t and tubes good; £9.—Letters only, Rouse, Bowen Rd., Harrow.

MOTOR Agents.—I have in stock for immediate livery new motor cycles: Rover, New Imper Calthorpe, James, Connaught, and Hockley. No perm required. Let me quote.—P. J. Evans, 91, John Bri St., Birmingham.

MARTIN-J.A.P., 4¼h.p., 1914, T.T., fast, econo car, and in perfect condition, £22; also Enfie 2¾h.p., 2-speed, dynamo lighting, £20, perfect; Trium 1910, 3½h.p., in perfect running order, £12, or exchan lot for good combination.—45, Pember Rd., Ken Green.

SPECIAL Bargains.—2¾h.p. Enfield, 2 speeds, £18/ 2¼h.p. Calthorpe-Jap, 1915, Enfield gear, £22/ 2h.p. N.S.U. lightweight, 2 speeds, £10/5; 3½h.p. Hu ber, 1913, 2 speeds, £25/5; 2¾h.p. Allon, 1916, speeds, clutch, £35/5; 6h.p. 1913 Rudge, Multi ge big single, £29/15; 6h.p. 1911 Rex, £11/15; 3½h Rex, 1910, low built, £11/15; 3½h.p. 1911 Humb 2 speeds, £18/15; 2¾h.p. T.D.C. De Luxe, £15/1 send stamp for detailed list.—Booths' Motories, Portla Place, Halifax. 'Phone: 1062.

RIDER TROWARD and Co. offer the followi machines for low cash or exchange figures, full details and list free: Allon, American Excelsior, Ar Bat-Jap (2), Bradburys (5), B.S.A.'s (2), British E celsior, Connaught, Coventry Eagle, Campion, Calthor (7), Douglas (9), Eufields (2), F.N.'s (2), Grand Hobart, Humbers (3), Harley, Harris-Peugeot, India (10), James (3), J.H., Kerry-Abingdons (3), Linco Elks (2), Levis, Matchless (2), Minerva, Metro, Mo sacoche, N.S.U., New Imperials (2), Nut-Jap, New H sons (3), O.K.-Jap, O.K.-Precision, P. and M., Premi (10), Precision, Quadrants (2), Rovers (2), Rex Rudges (14), Sun-Villiers (3), Sheffield Minor, Sing (2), Scotts (3), Sunbeam, T.D.C., Trinmphs (12), Velo Velocette, Wolf, Williamson, Whiting, Wooler, Zeniths (15).—31, 40b, and 78, High St., Hampstead

MOTOR CYCLES FOR SALE.

Miscellaneous.

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JONES' Garage.—1913 Rover, 3-speed Sturmey-Archer gear, in splendid condition, tyres perfect, enamelling and plating good, sound machine, date guaranteed accurate; £30.—Broadway, Muswell Hill.

JONES' Garage.—1915 Zenith and sidecar, not used since 1916, real good machine; bargain, £62.—Broadway, Muswell Hill.

JONES' Garage.—1915 2½h.p. Levis, a good machine; £22.

JONES' Garage.—1914 Triumph, 3-speed, in fine order, £44/10.

JONES' Garage.—1916 3-speed 3½h.p. Rover, like new; £55/10.

JONES' Garage.—1917 3½h.p. T.T. Rover, Philipson pulley, h.b.c., like new; £48/10.

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JONES' Garage.—1916 6h.p. Enfield combination, absolutely like new, electric lighting; £80/10.

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JONES' Garage.—1916 2½h.p. Royal Ruby, 2-stroke, as new; bargain, £22.

JONES' Garage.—1915 4h.p. Douglas combination, 3-speed, sidecar, like new; £60.

JONES' Garage.—1913 5h.p. Peugeot (Vindex), Bosch, B. and B., in perfect running order; £17/10.

JONES' Garage.—1914 cycle car, 8h.p., Bosch mag., 2-speed Chater-Lea gear, differential back axle; a very good cheap lot. £30.

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JONES' Garage.—1916 Crescent 2-stroke, Villiers engine, in perfect condition, new Dunlop tyres; £26.—Jones' Garages, Broadway, Muswell Hill. 'Phone: Hornsey 2562. [7827

BARGAINS.—Our premises will shortly be taken for munitions, and the whole of our stock must be cleared. Cash offers considered. 1915 A.J.S., £79/10; 3½h.p. A.S.L., £14/10; 1913 3½h.p. 3-speed Bradbury, £29/10; 2¾h.p. Diamond, £25/10; 1914 2-speed Douglas, £34/10; 1916 8h.p. Enfield combination, speedometer, etc., £82/10; 7-9h.p. twin Indian, £23/10; 1914 7-9h.p. Indian and sidecar, £49/10; 1914 Lincoln-Elk and sidecar, £45; 3½h.p. N.S.U. and new coach sidecar, £26/10; 3½h.p. Roach and new 1918 coach sidecar, £24/10; 5-6h.p. Rudge Multi and sidecar, £45; 3½h.p. Tourist Rex, £12/10; 2¾h.p. 3-speed Rex, £22/10; 2-speed twin Rex, £18/10; 6h.p. twin, n.o.v., £14/10; 2h.p. 2-speed Velocette, £25/10; 8h.p. Morgan, hood, screen, lamps, £72/10; Perry 2-seater, £125; 1914 10h.p. Stellite, 200 gns.—Motor Exchange, Horton St., Halifax. [8283

£10 to £20 purchases any of the undermentioned machines, all of which are guaranteed in running order: Minerva, 3½h.p., 9 gns.; Bat-Jap, 3½h.p., 3-speed, 13 gns.; Bat-Jap, 5-6h.p., 2-speed, 14 gns.; Douglas, 1911, 12 gns.; F.N., 4-cyl., 13 gns.; Triumph, 1911, 3½h.p., 13 gns.; Bradbury, 1912, 3½h.p., 2-speed, clutch, 19 gns.; Calthorpe, 1916, 2-stroke, single speed, 18 gns.; Connaught, 2-stroke, 17 gns.; Douglas, 1911, 2-speed, 17 gns.; Grandex-Precision, 1913, 3½ h.p., 2-speed, clutch, 19 gns.; Lincoln Elk, 1913, 3½h.p., variable gear, waterproof Bosch, 19 gns.; Rex, 1912, 6h.p., 2-speed, clutch, 19 gns.; Sun Villiers, 2-stroke, 17 gns.; Singer, 1914, 2¼h.p., T.T. clutch, 18 gns.; Humber, 1914, 2½h.p., lightweight, 16 gns.; Triumph, 1911, 3½h.p., 2-speed, clutch, 17 gns.; Wolf, 1915, single-speed 2-stroke, 19 gns. Full details on request.—Rider Troward and Co., 31 High St., Hampstead. [8620

ELCE & Co.

6 h.p. twin **P. & M.** Combination, 90 degrees, electric lights, horn, screen, watch; very good condition £100 0

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1915 **INDIAN** Combination, 7-9 h.p., electric lights £60 0

1915 **INDIAN** Combination, 5 h.p., lamps, horn £50 0

1916 **CALTHORPE** Combination, 5-6 h.p., J.A.P., 2-speed £55 0

1914 **RUDGE MULTI** and Sidecar, 3½ h.p., lamps, horn £35 0

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Immediate delivery from Stock of the W.O **MATCHLESS** Combination, 8 h.p. J.A.P., spare wheel, **£125.**

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MOTOR CYCLES FOR SALE.

Miscellaneous.

NOW or Never.—1915 Allon, 2 speeds, clutch, £30; 1914 4½h.p. James, chain drive, countershaft gear, kick starter, £30; 1914 6h.p. Hobart, J.A.P. engine, Enfield gear, £45; 8h.p. Powerplus Indian and sidecar, £65; 1912 3½h.p. Premier, N.S.U. gear, £20; stamp for particulars.—Farrar, 19, Hopwood Lane, Halifax. [8389

WANDSWORTH Motor Exchange.—Great bargains in real good up-to-date motor cycles: 1916 T.D.C., nearly new, 23 gns.; 1915 T.T. Douglas, 45 gns.; 1914 Douglas, nearly new, 42 gns.; 1914 Douglas, 35 gns.; 1915 Indian, 46 gns.; 1915 Indian, 42 gns.; 1916 Levis, 26 gns.; 1913 Zenith, 19 gns.; nearly new F.N., 55 gns.; F.N. 4 cyls., 18 gns.; 1914 Bradbury, 22 gns.; 1913 Bradbury, 19 gns.; 1912 Bradbury, 15 gns.; Brown Twin, 18 gns.; Humber, 12 gns.; Lea-Francis, 35 gns.; Rover, 35 gns.; 1916 Powerplus Indian combination, 75 gns.; 1916 Indian combination, 68 gns.; Clyno combination, 42 gns.; nearly new Humber combination, 38 gns.; 1914 Indian combination, 39 gns.; Edmund combination, 46 gns.; New Hudson combination, 48 gns.; B.S.A. combination, 33 gns.; full particulars upon application; exchanges and easy terms arranged.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). 'Phone: Battersea 327. [8579

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SEMI Torpedo Sidecar, good tyres, complete; 50/-.—115, Blair St., Poplar, E.14. [8577

35/-.—Chater cane sidecar, side door; bargain. 35/-.—53, Brownhill Rd., Catford. [8575

JAMES Canoelet Coachbuilt Sidecar, nearly new; room wanted; £9, or best offer.—9, The Parade, Cambridge Rd., Norbiton, Surrey. [8556

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SHOP-SOILED Sidecar Chassis, 20 only, complete with tyre and quick detachable joints; £4/4 each; cannot repeat.—Below.

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SIDECARS.—New James canoelet, £18/18; new sidecars complete from £12/12, or chassis and bodies separate; or by extended payments.—Service Co., 292, High Holborn, W.C.1. [8441

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RENNOC Sidecars.—Special department for sidecar body repairs, repainting, upholstering, lining, etc. Get into communication with our Mr. Conner. It will pay you. [7436

HOODS, WIND SCREENS, ETC.

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RENNOC Motor Sidecar and Engineering Works certainly lead in price, quality, and design of hoods, screens, aprons, etc.—86, Victoria Rd., Stroud Green, London, N.4. [7434

WIND Screens.—The Standard, 27/6; folding top, 32/6; double side wing screen, 45/-; the Fitall, 28/6; the fixed, 24/-; the Orto, 33/-, 55/-, and 60/-; Bluemels, 42/-; the Walbro, 36/-; fawn waterproof hoods, with strong wood frames and plated fittings, 42/-, 48/-, and 60/-.—Juno Showrooms, 248, Bishopsgate, London. [6896

BODIES.

CANE Sidecar Bodies.—Several to clear at 50/- each, worth £5. Write for design.—The Willowbrook Co., Leicester. [0901

RENNOC Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4, are actual Manufacturers, also have few clearance and second-hand. [7433

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RIDER TROWARD and Co., 31, High St., Hampstead, have always a good stock of cycle cars, including Cardens, Morgans, Chater-Lea, G.W.K., etc. [8617

MORGAN, 8h.p. J.A.P., complete with hood, screen, and all lamps, speedometer, etc., in almost new condition; £98.—Hopkins, New St., Ledbury. [X7262

HUMBERETTE, 1914, recently overhauled, hood, wind screen, spare tyre and Stepney; bargain, £62/10.—Young, 15, Evington Park Rd., Leicester. [X8348

MORGAN, 1917 De Luxe model, complete with hood, screen, C.A.V. dynamo, electric lighting outfit and 5 lamps, absolutely new condition throughout; £150.—Hopkins, New St., Ledbury. [X7261

1915 Morgan, sporting, Precision a.c., hood, screen, mechanical horn, spares, grey, good appearance and condition, tyres nearly new, Stepney Roadgrip rear; photo; 85 gns.—Durow, Hillside, Osmaston Rd., Derby. [X8398

A.C. Sociable, in perfect condition, very little used, stored since 1914, now taken for debt, totally enclosed against rain, ideal for winter use; accessories worth £20; any trial; £55.—Orton, 47, Hale Lane, Mill Hill, N.W.7. [8258

MORGAN De Luxe, 1915, J.A.P., Binks carburetter, hood, screen, 2 plated lamps, new chains, oversize tyres, thoroughly overhauled 6 weeks ago, first-rate running order; no reasonable cash offer refused.—Fields, Rothay Lodge, Grasmere. [X8343

HUMBERETTE, 1914, A.C., new condition mechanically, also bodywork, hood, screen, lamps, horn, speedometer, bought new, used only 6 months, any trial; £74; exchange for Douglas or Matchless combination.—Bruce Wood, Horn Park, Lee, S.E.12. [8513

MORGAN, genuine 1914, No. 1,130, smart 2-seater, 8h.p. twin, mag., screen, lamps, speedometer, nearly new tyres, painted red; any trial; bargain, 85 gns.; motor cycle or combination part payment; also easy terms arranged.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [8580

CARDEN Monocar, 1915, 2-speed De Luxe, 6h.p., 55 gns.; Morgan, sporting model, red finish, 68 gns.; Morgan, 1914, 8-10h.p. air-cooled J.A.P., disc wheels, hood, screen, 77 gns.; Morgan, 1914, Grand Prix, water-cooled J.A.P., disc wheels, hood, screen, 95 gns.; Morgan, 1915 Grand Prix, water-cooled J.A.P., disc wheels, 115 gns.—Rider Troward and Co., 31, High St., Hampstead. [8621

CARS FOR SALE.

20-24h.p. F.I.A.T., long chassis, £125; 14-16h.p. Argyll chassis, £45.—Palmer's Garage, Tooting. [8590

CAR, 7-9h.p., wants adjustments, for combination, or reasonable offer.—Photo and particulars, S., 5, Home St., Frindsbury, Rochester. [X8382

G.W.K. 2-seater, 8h.p., 2-cyl., water-cooled, friction drive, chain speed gear, with 4 speeds and reverse, weight 5¾-cwt., hood and screen, all complete; £135.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

PAY Luxury Tax? Not in these. Buy a car now, my boy, that's the tip. £50 saved on luxury tax will pay garage 4 years, while in 4 months—well "we has hopes." Anyway the war will be over long before the luxury tax is.—Cox, below.

TEMPTERS (remember many practically new); all dates below guaranteed accurate: 8-10h.p. Unique parcels lorry, late type, pointed radiator, watertight magneto, £50; 15-20h.p. K.R.I.T. torpedo, monobloc, gate, Claudel, Bosch, detachables, £65; 14-16h.p. Belsize 15-cwt. van, £65; 20h.p. 6-cyl. Standard semi-sporting 4-seater, worth treble, £75; 15h.p. Charron chassis, 4-cyl. monobloc, £80; 14-16h.p. Darracq traveller's omnibus, monobloc, gate, Zenith, £85; 8-10h.p. Alldays Midget 2-seater, Zenith, smartly repainted, £90.—Cox, below.

BUNGALOW Plots on Thames at Sunbury.—40 plots, 100 each, freehold (or let £12 annum); might consider good car value in exchange.—Cox, below.

13.9h.p. 1912 Darracq 4-seater monobloc, enclosed valves, Zenith, £100; 2-ton Berliet commercial chassis, twin solids, extra long wheelbase, £100; 8-10 h.p. Renault chassis, taxi type, £115; 14-20h.p. Renault chassis, 4-speed, long wheelbase, bargain, £125; 38h.p. Daimler T.M. four-stretcher ambulance, make fine commercial, £125; 30h.p. National sporting 4-seater, £125; 11.9h.p. 1916-17 Argo sporting 4-seater, electric starter, dynamo lighting, streamline, disc wheels, particularly smart, £135; 16h.p. Bayard 1-ton van, twin solids, £135; 12-15h.p. F.I.A.T. taxi type landaulet, monobloc, £135; 10h.p. 4-cyl. 1914 Deemster streamline 2-seater, detachable wheels, smart, £145; 10h.p. 1916 Horstmann streamline sporting 2-seater, 4-cyl. monobloc, disc wheels detachable, self-starter, £145; 10h.p. Calthorpe Minor streamline 2-seater, dickey, detachable wheels, monobloc, bargain, £165; 11.9h.p. Belsize streamline 2-3-seater, dynamo lighting, monobloc, detachables, £185; 1914-15 Studebaker van, £185; 15-20h.p. 1913 Star ¾ landaulet, detachable steel wheels, enclosed valves, long stroke engine, £235; 16-20h.p. Sunbeam chassis, enclosed valves, detachable wheels, 4-speed, £285; 15-22h.p. R.M.C. interior-drive saloon 4-seater, opens, dynamo lighting, detachables, monobloc, streamline, low, exceptionally smart, fine condition, bargain, £350; 3-ton De Dion commercial chassis, latest round radiator type, worm drive, enclosed valves, steel wheels, £385; 16h.p. Sunbeam streamline torpedo, dynamo lighting, detachable wheels, 4-cyl. monobloc engine, enclosed valves, smart, £385; all above actually on view. Please call. Hours, 8 to 6.30. No business on Sundays.—Douglas S. Cox, the absolutely straight motor man, 6c. Lansdowne Hill, West Norwood, S.E. Established 1902. [8022

WE have the following cars for sale for cash, extended payments, or your motor cycle in exchange: Enfield, Humberette, Horstmann, G.W.K. and G.N. Full particulars on application.—Service Co., 292, High Holborn, London. [8434

OVERLAND 1916 Model 75, No 52,424, 2-seater, with lorry back, dynamo, starter, speedometer, completely overhauled July; £160; no dealers; guaranteed new mechanical condition.—Goodfellow, 16, Avenue Mansions, Battersea, S.W.11. [X8252

1916 Caltborpe Minor, 4-seater torpedo, fitted with one-man hood, double folding screen, side curtains, cover for back seats, 5 Sankey wheels, 710×85 Palmer cord tyres, electric side and tail lamps, electric horn, speedometer, body painted grey, black wings, in perfect order throughout; £250.—Godfreys, Ltd., 208, Gt. Portland St., London, W.1. [8070

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good selection of second-hand cars; motor cycles, and cars taken in part; instalments arranged. Present stock includes: 35h.p. Mercedes, 40h.p. Isotta-Fraschini, 25h.p. Imperia-Belge, 25h.p. Weigel, 40h.p. Nordenfeldt, 16-20h.p. Wolseley 5-seater, 12.9h.p. Sizaire-Naudin, 11.9h.p. Belsize 15,9 h.p. Brisoces, new and second-hand, etc., etc. [8615

TRAILERS.

LUGGAGE Trailers!—Several patterns from stock, others to order. Please call.—Trailer Manufacturing Co., 65, Rosendale Rd., West Norwood. [7880

EXTENDED PAYMENTS.

EXTENDED Payments.—All makes supplied, new and second-hand; lowest terms.—Service Co., 292, High Holborn, London. [8437

ENGINES.

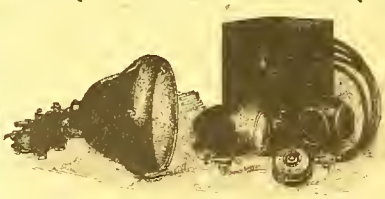
8h.p. J.A.P. Engine for sale, internal parts all new; £14.—Pattison, 87, Allesley Old Rd., Coventry. [X8391

4¼h.p. Precision Engine, waterproof Bosch magneto, carburetter, complete; £16.—27, Burns St., Leith. [X8364

BELTS.

BELTING, best makes, 2-piece at half usual price, post paid, fastener free; ¾in. 10d., ⅞in. 11d., and 1in. 1/- per foot.—Pitts, Motors, Redditch. [X8426

F.R.S. ELECTRIC

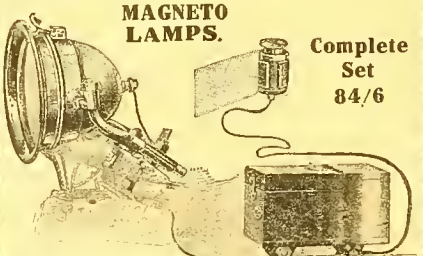


Sidecar sets, complete, as above **143/-**

Lamps only, with handle-bar fittings **42/-**

MAGNETO LAMPS.

Complete Set 84/6

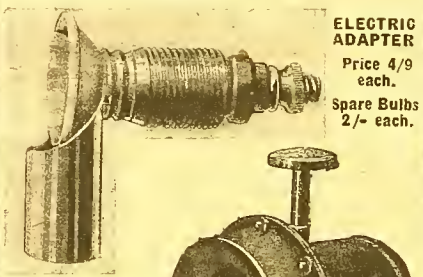


A new method of obtaining light, sufficient for two lamps, from the extra current produced by magneto, which has been wasted so far. As soon as engine starts the lamps light. Perfectly simple and foolproof. No trouble in future to get your lamps lit. An accumulator is fitted into box for use when machine is at a standstill.

ELECTRIC ADAPTER

Price 4/9 each.

Spare Bulbs 2/- each.



This is a small fitting to enable owners of gas lamps fitted with burners of the Roni type (round stem) to make their lamps into electric.

The "adapter" fits over the existing burner with a tight fit, and is connected to an electric wire and battery.

BRITISH HORN

Price 21/6

Accumulator Electric Lighting.

Complete Set, 100/-

For Solo Machine. This set contains head lamp and tail lamp of the latest approved design, with adjustable handle-bar fittings. The box to fit on the top tube contains a 4-volt accumulator and a switch, giving sufficient light for the two lamps for approx. 10 hours at one charge. It, without doubt, fills a long-felt want for solo machine lighting.

F.R.S. LAMPS, "BEAM" Works, Pershore Street, BIRMINGHAM.

IGNITION APPLIANCES.

FOR Magneto Repairs, spares, re-magnetising, Br magnetos and dynamo lighting equipments, v or 'phone Streatham 2108. Established 1900.—I land Bros., Crescent Magneto Works, Norbury, Lon S.W. [8

JEBRON, registered 291,298, greatly superior platinum, unequalled for blades, screws, cures misfiring; 5/- each rivet; Jebron screws, fit B magnetos, 11/- pair; old screws Jebronised, 5/- eac

JEBRON Contacts, used by Messrs. Collier Bi Colver, Martin, making world's records.—Jeb 38, Herbert Rd., Woolwich, London, S.E.18. [X4

TYRES.

BASTONE'S for Covers and Tubes.—Special cleara line as below.

BASTONE'S.—26×2 Michelin 9/6, Michelin s stud 20/-, steel grooved 14/-.

BASTONE S.—26×2¼ Michelin Trident 19/6, Hut inson Brooklands 21/6, T.T. 29/-, Moseley stud 18/6, Kempshall 19/6, British-made heavy rubber n skid 34/-.

BASTONE'S.—26×2⅜ Hutchinson T.T. 30/-, senger 36/-, British-made heavy rubber non-s 37/-.

BASTONE'S.—26×2½ Michelin 20/6, Goulios be rubber non-skid 18/6, Shell heavy grooved 18/

BASTONE'S.—650×65 Henley plain 32/6, Hutch son twin-ribbed heavy 39/-.

BASTONE'S.—Wired edge covers, 26×2 and 26×: Michelin Trident 17/-, Michelin ordinary 26×: 12/-, British-made 26×2¼ 12/-, 26×2½ 14/-.

BASTONE'S.—Red tubes, guaranteed: 26×2 4 26×2¼ 5/3, 26×2½ 6/-, 26×3 7/-, 28×2¼ 7 28×2½ 7/6.

BASTONE'S, 228, Pentonville Rd., King's Cro London, N.1. Tel.: 2481 North. [82

THE Economic Tyre Co.—Special clearance lin carriage paid; approval against remittance.

ECONOMIC.—26×2¼ Kempshall anti-skid, 17/ selected covers, 21/-; 26×2⅜×2¼, 23/-; 26×2 Kempshall non-skid, 27/6; selected, 32/6, listed 53/4

ECONOMIC.—24×2¼ de Luxe for 2-strokes, 30 listed 39/6; 26×2½×2¼ de Luxe, extra heavy, 35

ECONOMIC.—26×2½ de Luxe, extra heavy, 35/ Kempshall non-skid, 45/-, suit heavy machines.

ECONOMIC.—650×65 3-ribbed Dreadnought, 42/ listed 55/-; 26×3 Kempshall heavy anti-skid, 51/

ECONOMIC.—28×3 Kempshall anti-skid, 35/-, list 69/3; A Won passenger, 45/-; fluted, 35/-.

ECONOMIC.—26×2¼ tubes, 7/6; 26×2½×2¼, 7/ 26×2½, 7/6; belts from 9d. foot.

ECONOMIC.—Cycle covers, various sizes, 20% to 50 off list, to clear; postage extra.

ECONOMIC Tyre Co., 137a, Lewisham High Rd New Cross, S.E.14. 'Phone: New Cross 1393. [753

TYRES, best makes, at reduced prices; 26in. an 28in.; send size when enquiring.—Pitts, Motor Redditch. [X842

NEW Heavy Beaded Covers, 26×2 15/-, 26×2¼ 20/ 26×2½ 22/6; butt-ended tubes, 26×2¼ 8/6, 26× 2½ 9/-; endless tubes, 26×2¼ 7/6, 26×2½ 8/-; sea approval carriage paid receipt remittance.—Palmer Garage, Tooting. [709

ELITE Rubber Co., Ltd.—We have the followin special clearance lines in motor cycle covers, belts tubes, etc. These goods are quite new. Any article sen on 7 days' approval against remittance. A 3/- outfi sent free of charge to all purchasers of covers and tubes as advertised, on orders exceeding £1.

ELITE.—26×2 Clincher heavy De Luxe, 28/6, listed 38/-.

ELITE.—Bates No. 1 special heavy, 26×2¼, 30/- listed 50/6; 26×2⅜, oversized for 2¼ rim, 35/- listed 53/6; 28×3 50/-, listed 72/6.

ELITE.—Pedley extra heavy 3-ribbed, 26×2⅜, over sized for 2¼ rim, 30/-, listed 55/-.

ELITE.—Kempshall heavy non-skid, 26×2½, 46/- listed 63/3, very special line.

ELITE.—Special offer: Goodyear diamond rubber studded, 26×2, 26×2½, to fit 2¼ rim, 26×2½ rim, and 650×65 voiturette. Please write for quotation.

ELITE.—Best quality inner tubes, fully guaranteed; 26×2 6/-, 26×2¼ 7/-, 26×2⅜ 8/6, 26×2½ 8/6 26×3 9/6, 28×3 10/-, 650×65 11/-; butted 1/6 extra.

ELITE.—Best quality belts (cannot advertise name). 6ft. lengths by 1in., 7/6 each; 6ft. 6in.×⅞in., 6/9 each.

ELITE.—Pedley belts, any length, ¾in. 1/5, ⅞in. 1/7, 1in. 1/11, 1¼in. 2/3.

ELITE.—Retreading; extra heavy 17/6, heavy 15/-, medium 12/6; time required 7 days.

ELITE Rubber Co., Ltd., Head Office 321-3, High Rd., Streatham, S.W.16. 'Phone: Streatham 1467. Also at 266, Vauxhall Bridge Rd., Victoria, S.W.1 (one minute from Victoria Station). 'Phone: Victoria 6553. Please address all communications to Head Office, Streatham. [0933

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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South Africa—Central News Agency, Ltd. Paris—Smith's English Library, 248 Rue Rivoli.

Motor Cycle Schools.

THERE is a demand at present for a certain number of men and women, mostly the latter, for war work. Women motor cyclists are employed in the Women's Legion (A.S.C.), the Wrens, the W.R.A.F. (Penguins), and other branches of the forces. Many of these recruits have had no previous experience, as the few pre-war lady motor cyclists have long since been enrolled. The Army undertakes the training of new arrivals, but it is to the advantage of both the authorities and the recruits that the latter should have had some previous experience.

As mentioned in a recent paragraph in these pages, we are sometimes asked where motor cycle riding can be learned, and when this happens it is our unpleasant duty to have to tell the applicant that no recognised motor cycle schools exist. Since the paragraph appeared, however, one or two firms have displayed interest in the idea, and it seems likely that our suggestion may bear fruit.

There are plenty of first-class motor schools in London and the provinces, where aspirants to motor driving positions may go through a course of technical instruction and a series of driving lessons. The Royal Automobile Club has done splendid work ever since 1905 in inspecting these schools and appointing them officially. A school seeking the Club appointment has to show that it is a properly organised concern, it has to lay its premises open to inspection, describe the instruction given, show its equipment as regards models and cars, and produce a list of fees charged. The appointment is only held for one year, and is not renewed unless the conditions agreed to by the appointed school are fulfilled.

At present there exists no such machinery in the motor cycle world, but so soon as the schools come into existence, as we have every hope of their doing, it will be the duty of the A.C.U. to follow in the footsteps of its parent.

There are difficulties, of course. Motor cyclists will be rather harder to examine than car drivers, but if instruction and examination are given only on sidecar combinations many of these difficulties will disappear. A pupil who can ride a pedal cycle, after qualifying on a sidecar outfit, will be quite competent to drive a solo mount after a very little practice. Instructions should therefore be given on sidecar outfits of a make used by one of the Services, lectures should be given on the internal combustion engine generally, and the air-cooled variety in particular, followed by a description of the types of gears and clutches commonly employed, a brief reference to frame construction, brakes, springing devices, such as are now in vogue, carburetters, and lubrication. Special importance should be given to roadside repairs, including valve changing, valve and magneto timing, a few simple workshop adjustments, such as valve grinding and tyre repairs. The driving certificate examination need not occupy more than fifteen or twenty minutes, but should include traffic driving, the negotiation of a short hill which would entail a change of speed, and restarting on a hill. A few questions on roadside repairs should also be asked by the examiner. Whether these certificates are recognised by the Services or not does not greatly matter, as their chief importance is to show the candidate whether he or she is qualified to enter for a Service test.

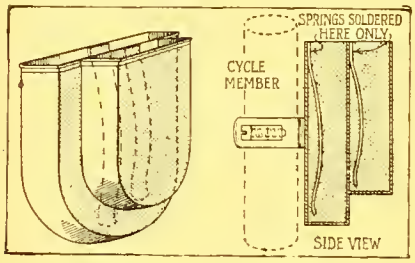
That properly recognised motor cycle schools are needed is demonstrated by the sad case reported in our issue for September 26th, therefore we feel quite confident that in making these suggestions we are dealing with a subject of extreme urgency which cannot but confer a benefit not only on the motor cycle community, but on the nation, while, after the war is over, these schools will serve to help the novice to overcome difficulties which in the natural course of affairs are only surmounted at the hands of that hard and expensive instructress—Experience.

An index to the advertisements in this issue will be found on the page facing the back cover

IDEAS: Useful and Ingenious.

CARRYING PETROL SQUIRT

I HAVE for a long time found the little fitment sketched a convenient way of carrying the oiler and petrol or paraffin squirts. It consists simply of two pockets made of strong sheet tin, with a suitable clip at the back for fastening to any convenient member of the cycle frame—in my case the saddle-pillar tube. The feature of the thing

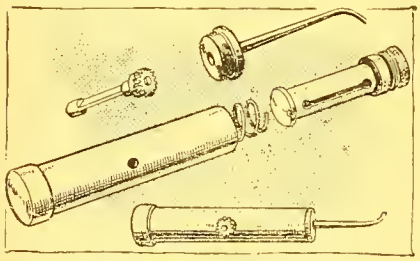


A simple and accessible holder.

is that inside each pocket is soldered a bent strip of ordinary clock spring, as indicated in the section. When the squirt is in position, the spring is straightened out considerably, and thus exerts pressure on it, making it perfectly secure. The squirt can be withdrawn and replaced easily with one hand, there being no clips to bother with or forget to fasten.—ESELLE.

A SPRING-OPERATED PETROL AND OIL INJECTOR

THE advantage claimed for this injector is that it may be operated by one hand, and as the petrol is forced out with considerable force it is atomised, and so facilitates starting when injected through the compression tap or into the induction pipe. The injector may also be used for forcing oil into inaccessible lubricating holes, such as those on the hubs.

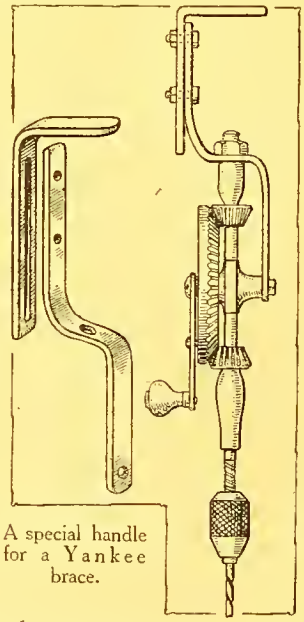


This injector atomises the petrol.

It was made from an ordinary brass tyre pump, a piece of $\frac{1}{8}$in. wire with a $\frac{1}{16}$in. hole drilled through it longitudinally, and a short flat shaft for holding the piston back against the spring and for releasing it when required. The construction of the instrument is made quite clear by the sketch, but a hint may be welcome on the drilling of the hole through the wire. Start the operation with a short or broken drill, making sure, before exerting any pressure, that it is absolutely central and in a straight line with the wire. When the short drill has reached its limit, withdraw it, and proceed with a longer one, but do not start drilling from the other end of the wire, as the only possible result is disaster. If the drill does not come out of the wire as centrally as it went in, the error may be rectified by filing the outside of the wire. The bending is, of course, done afterwards.—R.

A FEW TIPS ON THE USE OF A YANKEE BRACE.

NEARLY every motor cyclist who does his own repairs has a Yankee brace among his tools. At times he may find it impossible to get the brace into the right position for drilling, owing to some obstruction being in the way of the top handle. If a handle is made as



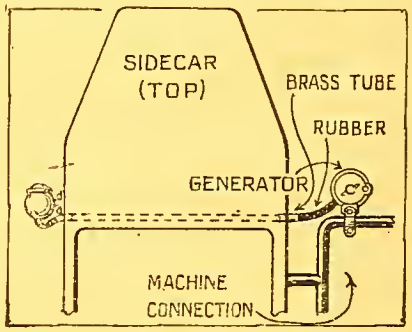
A special handle for a Yankee brace.

shown from a strip of iron $\frac{3}{4} \times \frac{1}{4}$in. or $\frac{5}{8} \times \frac{1}{8}$in., according to the size of the brace, a lot of seemingly impossible holes can be drilled. It is quite easy to bend up to shape, and is quickly fitted by unscrewing the wooden handles, after first removing the pin that locks the top one.

Though not intended for such use, the Yankee brace can be used for grinding scrapers, drills, and other small tools. This is done by clamping the brace in the vice by the handle described, mounting in the chuck a suitable spindle with a small emery wheel on it, and getting a friend to turn the handle while the grinding is being done. Emery wheels can be purchased at any tool dealers.—E.A.K.

PIPE FROM GENERATOR TO SIDECAR LAMP.

I HAVE noticed many machines have a small generator on the off side of the sidecar and a rubber pipe running across the front of the sidecar to the lamp on the rear side. I had this on my machine at one time, and found that the rubber rubbed off the paint of the sidecar and also was always requiring to be replaced. My present device is as follows: A small hole is drilled through the sidecar and a small brass pipe runs



Neat method of connecting lamp.

through it (pipe about $\frac{3}{16}$in. bore). The tube should be placed as near the top of the sidecar as possible. This gives a minimum quantity of rubber, and thus saves the expense of renewing so long a piece. I also have a long brass tube running along the top tube to the back lamp from the front generator, and having a T piece near generator, so that both front and rear lamp can be supplied from one generator. This is a great saving.—B.W.M.F.

SUBSTITUTE FOR CARBON BRUSHES.

IN searching for the cause of a defective or absent spark, the unwary would do well to exercise care in removing the carbon brushes for "roughing up." If, however, he should break one of these brittle twiddley-bits in the process, and is unable to replace in the ordinary way, he should get a pocket flashlight battery (a spent one will do), take the cells apart, warm one by the fire to soften the shellac, and withdraw the carbon stick from the centre. When cut to length and ground down to right thickness, this will be found to answer admirably.—J. DODD.

OCCASIONAL COMMENTS

BY "IXION"

Wanted, a Non-rusting Toolproof Finish!

NO invention would be more heartily welcomed by motor cyclists than a method of finishing off metal surfaces, which should be proof against rust, would stand up on such parts as nuts which are subjected to tools, and would look tolerably decent. As things stand at present, we are not in sight of any such process, though its inventor is assured an extremely rich harvest, for it is urgently required on all metal work under exposure to weather, from door knobs and boot scrapers to railway engines and ocean liners. The nearest approach to it may be identified in the black oxidation process already applied on a limited scale to a few motor accessories, such as lamps and horns. This finish is rustproof, but not toolproof; and it is employed on such a limited scale that there must be technical or financial difficulties in its application. Second to oxidation, stand certain methods of utilising celluloid, adopted on Rudge-Whitworth bars and hubs, Dover steering wheels, Lucas hooters, etc. This finish is very smart and inexpensive, and is waterproof, but does not wear well enough to be applied to parts subject to friction. In the meantime we are condemned to nickel plating, which is as great an absurdity on a motor cycle as patent leather pumps would be on the feet of a ploughman. Inventors, forward, please!

The Shaft Drive.

YEARS of patient listening and prolonged experiment have failed to convince me that the chain drive is intrinsically superior to the belt or the chain-cum-belt. So far as maintenance goes, a well-designed belt drive is an infinitely pleasanter possession than the chain. The one real snag of the belt is that it appears at its worst when the transmission is most severely tested, *i.e.*, on mountainous roads in bad weather; and the one real snag of the chain is that, if it breaks, it generally inflicts damage on other items. The present popularity of the chain is mainly founded on the fact that nobody has ever produced a really sound hub or crankshaft speed gear, and it has been reinforced by the needs of the sidecar, and by fresh trials, too severe to give the belt a fair chance, and too short to show up the intrinsic failings of the chain. Therefore, I cannot regard the chain as more than a transient fashion. I am divided in opinion about the future. If poverty compulsorily simplifies our tastes, the cheap popular machines of the future may even now revert to the direct belt drive plus a hub or crankshaft speed gear. If Europe recovers from the present lavish destruction of wealth, we may see the shaft come into its own. A shaft drive, if manufactured under a proper production system, need not be more expensive than a chain. It would be infinitely better-looking. Apart from lubrication, it would only require attention once or twice a season. It is adaptable to various locations of the gear box and to any series of ratios. It should prove indefinitely durable, judging from car practice. It is, in fact, an obvious ideal if we grant one of two necessary conditions. It must either incorporate a very excellent shock absorber, or else it must be fitted behind a genuinely smooth-running engine.

The Possibilities of Shaft Drive.

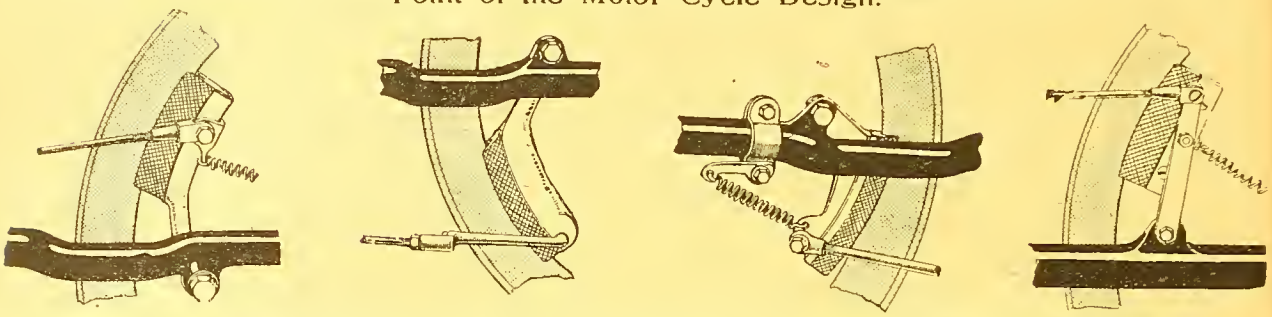
FOR all practical purposes, our experience of shaft drive is limited to two machines—the 2½ h.p. single-cylinder and the 5-7 h.p. four-cylinder F.N.—though a few other makes have been fitted with this transmission. On the four-cylinder the shaft drive unquestionably made good: a few owners were hurt through jamming of the transmission, but not a higher percentage than have taken tosses through chain-drives becoming locked. On the single-cylinder the shaft drive was stigmatised as harsh, in days when people stipulated for a less degree of comfort than we expect in 1918. In both cases the drive was fitted to fast-running engines, and the gear reduction was abnormally high. Broadly speaking, it would be safe to fit a well-designed shaft drive to our four-cylinders and flat twins without delay: but it would be a questionable proceeding to stick this drive on a V twin, and an absurdity to put it behind the ordinary slogging single-cylinder. Theoretically, the chain is a "rigid" drive: but it possesses an element of "give," however slight, which fundamentally differentiates it from the shaft.

The Minor Worries of Motor Cycling.

THE last two paragraphs have stirred the muddy waters of my memory, and brought to the surface many of the petty troubles of the past. My mind flies back to 1903, when, for example, I congratulated myself if I rode fifty miles without adjusting my contact breaker, or completed a tour without fitting new wires to both my rim brakes. I marvel to recall how much we pioneer motor cyclists put up with. In 1933, no doubt, our sons will recall with bated breath what hardy lads we 1918 motor cyclists used to be; how we tolerated four or five punctures in a day; how we fished with a bent wire for the ends of a broken chain inside a tin chain case which we dared not dismount for fear of never getting it back again; how we chased elusive rust from a million chinks and crannies; how we scooped oil and dust out between the top frame tube and the tank; how we braved the night with carbide and water gas generators; and how enduringly and patiently we tolerated a myriad other prehistoric nuisances, ranging from police traps and A.C.U. trial routes to "substitute" petrol at 3s. a gallon. We are sure at least of a posthumous fame.

BRAKING SYSTEMS.

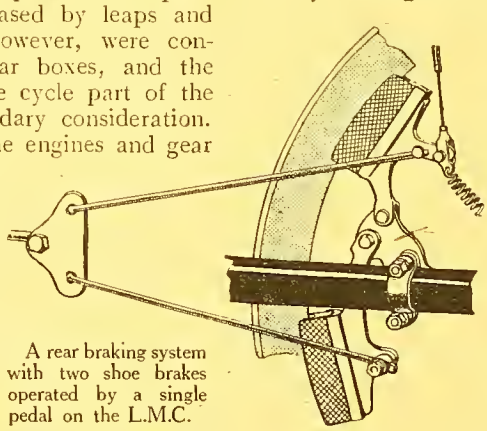
A Plea for Closer Attention to and the Employment of Better Mechanics on this Point of the Motor Cycle Design.



Four typical examples of rear shoe brakes. The first is above the stay, and has very good leverage. The second illustration depicts a rear brake below the stay, which is similarly proportioned. The third example is not so good, the pivoting point being very near to the heel of the shoe, while the fourth illustration represents a rear shoe pivoted at its centre to give compensating results. This latter type has a tendency to turn over and jam.

IT is far from the writer's intention to decry the designers' efforts in the past. Although there are many points connected with motor cycles in need of their attention, one must admit that during the few years prior to the war the quality, power, and speed of the average motor cycle increased by leaps and bounds. These improvements, however, were connected with engine efficiency, gear boxes, and the driving mechanism generally. The cycle part of the machine, apparently, was a secondary consideration. So much was done in respect of the engines and gear boxes that they seemed to absorb the major portion of the designers' time.

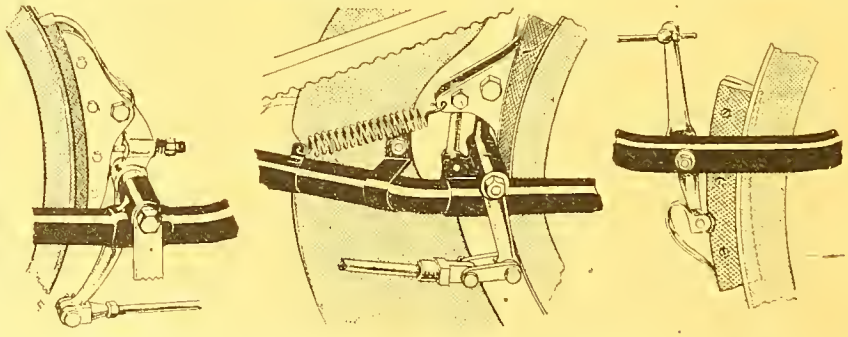
We have now reached a stage in design when attention to the engine and gear box lessened to some extent, or, in other words, development of these important parts has gone so much ahead of the cycle part of the machine that more concentration is needed at the latter point in order to make it worthy of the mechanical feature.



A rear braking system with two shoe brakes operated by a single pedal on the L.M.C.

Perhaps the most important detail appealing to the brains of the designer is the braking system. Although a large number of designers, even before the war, were displaying activity in this direction, one cannot say, taking them on the whole, that motor cycles had or have a really adequate braking system. No one who is at all mechanically inclined can agree that the conventional shoe brake working on or in a V sectioned rim is mechanical. It is more or less effective, but so long as such brakes are made to operate on an enamelled or plated rim, they cannot be regarded as being ideal. For one reason the enamel or plating is worn off by the action of the brake and the surface then becomes rusty. In the writer's opinion, the rear rim brake is only two degrees removed from the crudest of all forms of brakes, *i.e.*, the shoe working upon the surface of the tyre—the small wheel-rim brake, as used on the majority of cycles and as front wheel brakes of motor cycles, being the intermediate system.

Probably the greatest disadvantage of the fibre-shod shoe brake is its quick-wearing propensity. The majority of these brakes are on such a principle that the whole of the frictional surface cannot come into action on the rim. When new, and if the radius of the outer edge of the block when against the rim is the same as that of the rim, then approximately the whole of the surface comes into contact. But immediately wear commences this uniform contact no longer exists. Theoretically the contact should remain uniform. In the majority of cases, however, it is not so, and even in those few instances where uniform contact is retained the block does not bear level on account of the radius of the brake shoe fulcrum.



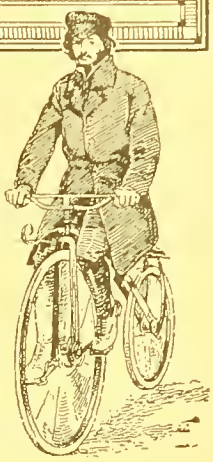
Rear brakes working on the V of a brake rim. (Left) A Humber example. (Centre) The latest Rover design. (Right) The Triumph. All are designed to obtain a more or less parallel action.

Some makers have fitted a brake shoe that is swivelled at its centre, in order that the block or pad would find its own level, wear evenly, and so give the block a longer life. These brakes, however, were rarely properly devised, and

DON'T FEEL SORRY FOR A DISABLED MAN—EMPLOY HIM.

1854 1918

From the Days of the Crimea



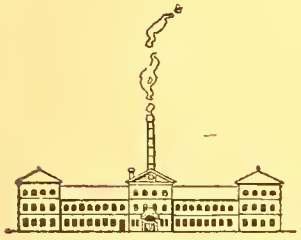
SOME EPISODES IN

B.S.A. HISTORY.

ORIGIN OF THE B.S.A. COMPANY

IT is an interesting fact that it was owing to a shortage of munitions during the Crimean War that The Birmingham Small Arms Company had its origin. The Government of that day found it necessary to call on 16 firms of Birmingham gun-makers to furnish a supply of arms, and from this beginning originated the great B.S.A. Factories which have, on more than one occasion, proved of National importance.

Though over 60 years have passed since the time of the muzzle-loader—entirely hand-made, and typically British in the excellence of its workmanship and material—B.S.A. productions have unceasingly maintained the same high standard of quality. To-day B.S.A. Bicycles and Motor Bicycles, by their reliable service under the severe test of modern warfare, are still upholding the great B.S.A. traditions.



Original B.S.A. Factory, 1851

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The Fables of Fame

A dwarf, burdened by a heavy pack upon his shoulder, met a giant upon the highway. "Oh, sire," piped he, "were I but as big and as strong as you my load would seem but trifling." The giant replied, "And if you were as big and as strong as I, my friend, your days would be spent in one long search for sufficient nourishment to maintain your hulking body. Your load's beyond your power to carry, my power's beyond my means to support. Let us envy those whose build *befits* them for the task that lies before them."

The modern car, to all but those whose purse is long time becomes a giant whose appetite for fuel is never gratified. The Motor Cycle, with a sidecar as an afterthought, is like the dwarf—its load becomes a burden to its engine. The *one* machine, *the* only one in which the cycle *and* the sidecar are *one unit*—the one that's built for two—is the

CLYNO

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It will perform, more perfectly than any other, the task that lies before it, that of giving *most* in comfort, *most* in speed, and *most* in pleasure to those who order it to-day.

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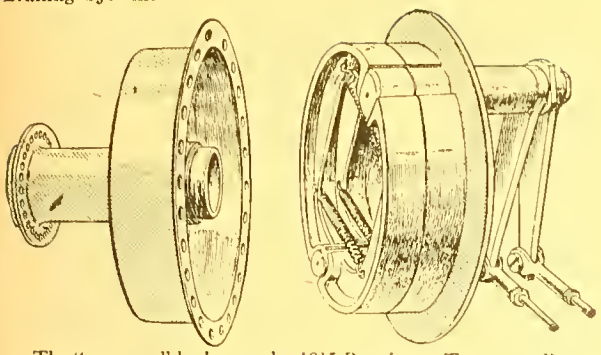
Braking Systems.—



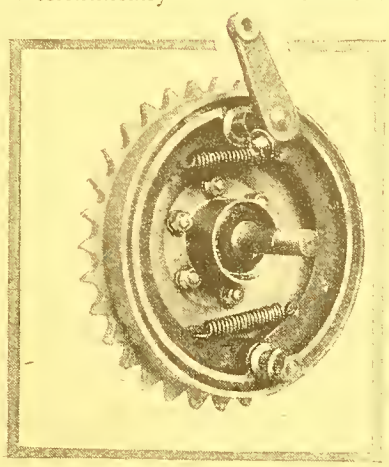
The "car type" brakes on the 1915 Premiers. Two expanding brakes side by side.

were prone to jam and turn over, while rim brakes generally are of little service to hold a machine and prevent it running backwards when a stop is made on a hill.

In short, rim brakes very seldom were scientifically designed, as witness the fact that almost every make differed at this point. No two makers appeared to agree as to the best location of the brake. On some machines they were placed over, on others below, the stay, at varying distances from the stay, and operated at different leverages. There were some placed inside the stay, while a few makers fitted two shoes—one above and the other below.

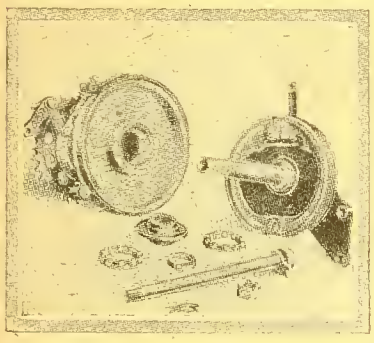
Brakes Inside the V Rim.

A step in the right direction was made by several makers when they introduced designs embodying brakes working inside the V belt or brake rim. Notably among these were the makers of the Humber, Lea-Francis, Rudge, Abingdon, Enfield, B.S.A., and Blackburne.



The Chater-Lea internal expanding brake within the chain wheel of the rear hub.

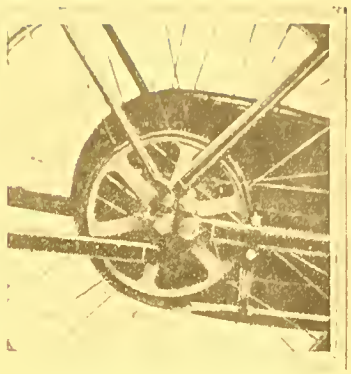
This system is vastly superior to the other rim brake. It is more powerful because of the wedging action, but, incidentally, this can be over-done. Chief among its advantages, however, is the fact that the wheel can be removed without disturbing the brake mechanism, and on this one point of accessibility alone it has become a popular principle. This form of brake, however, may have just as many drawbacks as the other when the uneven wear of the pad is considered. Therefore, to make the braking system more soundly mechanical, it would appear that all forms of rim brakes should be abandoned, and others of the internal expanding or external contracting type substituted.



An internal expanding brake with one of the contracting type working on its drum—a feature of the Dayton, an American machine.

Car Type Brakes.

The internal and external brakes generally are known as "car types," on account of the fact that they are now universally used in the senior branch of automobile engineering. After all, when full consideration is given to such points, it would seem that the motor cycle engineer cannot go far wrong if he follows in the steps of his *confrère* who designs cars. One cannot imagine a rim brake of any form being tolerated in the car world.



The P. and M. "band" brake.

The car types of brake as applied to motor cycles may be divided into five classes: (*a*) The single external contracting brake; (*b*) the single internal expanding type; (*c*) the double external; (*d*) the double internal; and (*e*) the internal expanding and the external contracting.

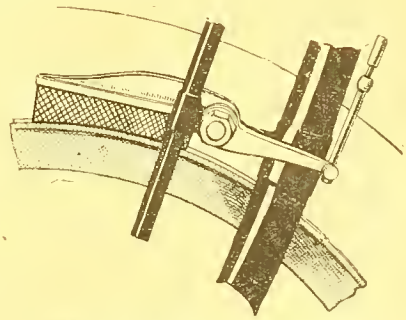
Probably it will surprise the majority of readers to know that most of these types are in use on motor cycles. The P. and M. and the Allon two-stroke have the first-mentioned type fitted. The latter machine is equipped with this type of brake for its front wheel also. The Chater-Lea, Clyno, Bradbury, and most of the American machines, among others, are fitted with the internal expanding type of brake.

Two Brakes on One Wheel.

The double external type—that is, two contracting brakes side by side—has not appeared on a motor cycle to the writer's recollection, but two internal expanding brakes within one drum were a feature of the 1915 Premiers, lightweight included.

Machines fitted with external and internal brakes are very few: the Bat had such a system, and one or two American machines practically unknown in this country.

It cannot be said that to have both brakes on one



A front brake, operating in a belt rim, introduced by the Lea-Francis Co. The example illustrated is the B.S.A.

Braking Systems.—

wheel is any great advantage; in fact, the loss of a front wheel brake is keenly felt for steadying purposes on descending steep hills. Also, when one brake is sufficient to lock a rear wheel, it seems fallacious to give that same wheel another brake. In such cases, one brake is merely a reserve in case the other one gives out and the driver considers he has but one brake.

It is agreed generally that the average front brake is a mixed blessing at the best. Owing to the sharp bend in the operating cable, it quickly goes out of action if used to any extent. Mechanically, it is but an inheritance from the pedal cycle, and is in need of even greater attention at the hands of designers than the rear brake.

Several makers, however, are now, or were before the war, fitting the "belt rim" type of brake to the front wheel. The Lea-Francis and Enfield are among the best examples. Messrs. Alldays and Onions, however, are leading the way with an improved front brake by incorporating it in the front hub, and I think the time is not far distant when either internal expanding or external contracting brakes for both front and rear wheels will be the rule instead of the exception on British motor cycles. VEDETTE.

Post-war Supplies and Demand.

ABNORMAL demand and limited supplies will be the keynote of commerce after the war. In the engineering industries this will apply particularly: and as it is known that metals will be rationed for a period immediately following the cessation of hostilities, it is only natural to assume that those industries classed in the luxury category will not be treated so liberally as others.

At present the trade generally is not troubled in mind concerning the Luxury Tax. It appears to be considered that the demand will so exceed the supply that purchasers will be glad to pay a premium in addition to a Luxury Tax to secure delivery. If, however, the inclusion of motor cycles in the luxury category has its effect on the rationing authorities, the antipathy of the manufacturers may rebound and further reduce the supply and output of their factories.

Fortunately, perhaps, it is not in keeping with the traditions of Government Departments that such sections as rationing and taxation will work hand in hand, but in this case it is not necessary for co-ordination. If motor cycles over £50 are to be regarded as luxuries, they will come before the rationing authorities as luxuries, and it is too much to expect that motor cyclists will be in any way represented to point out that motor cycles are used just as much for utilitarian purposes as motor cars.

So far there has been little evidence to show that the trade is at all disturbed by either the Luxury Tax or post-war potentialities regarding supplies. However long the war may last, the time has come for the motor cycle manufacturer to put his house in order. Many think that this is being done. But is it? As one moving in the heart of the industry, and in a fair position to know the real facts of the case, I can say honestly that the majority of manufacturers are not yet thinking of post-war trade, except as a pleasant anticipation akin to a dream. SPES.

Tank stopped on a flooded road. The one comes to help the other out of the ditch

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A series of other practical sections are those on: How to Mend Windows—To Make Handsewn Boots and Shoes—To Mend Boots and Shoes—To Make Soap at Home—To Waterproof Coats and Cloth—To Make Office Furniture—To Join Two Pieces of Iron—To Build a Cycle Shed—To Reseat Cane Chairs—To Make a Gramophone—To Clean and Adjust a Typewriter—To Clean a Watch—To Alter Gas Fittings to Take Inverted Burners—To Cure a Smoky Chimney—To Mend a Hole in a Hot Water Cylinder—To Make Waterproof Cement—To Mend a Hole in the Roof—To Make Old Brown Boots Equal to New—To Mend Table Knife Handles, Broken Penknives, etc.—To Clean and Repair a Primus Stove—To Make an Oxford Frame—To Fix Curtains—To Restring an Old Piano—To Cure Dry Rot in the Floor—To Dress Skins—To Stuff a Dead Animal or Bird—To Warm Two Bedrooms from One Fire—To Make Garden Frames and Rustic Furniture for the Garden—To Make Household Furniture—To Upholster a Couch, Chairs, etc.—To Retape Venetian Blinds—To Gild Metals—To Bevel and to Silver Glass—To Make a Child's Folding Mailcart—To Add a Hood to a Mailcart or a Perambulator—To Fit Up a Clothes Post—To Repair Sewing Machines—To Make and Fit Shelves and Racks—To Make a Corner Cupboard—To Make a Chemical Weather-glass—To Build a Poultry-house, etc.—To Fix Stair Carpets—To Make a Hecktograph (for duplicating written matter)—Micrometers and How to Use Them—How to Read and How to Prepare Working Drawings, etc., etc.

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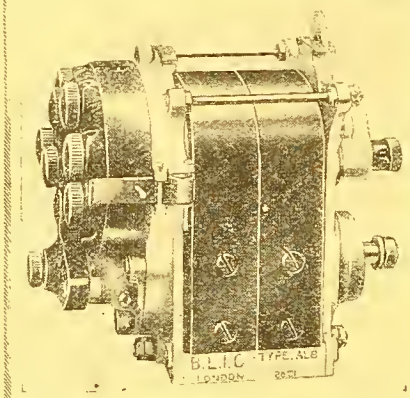

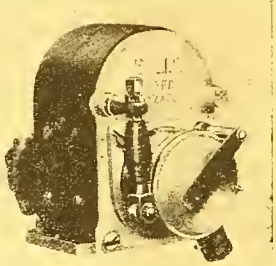

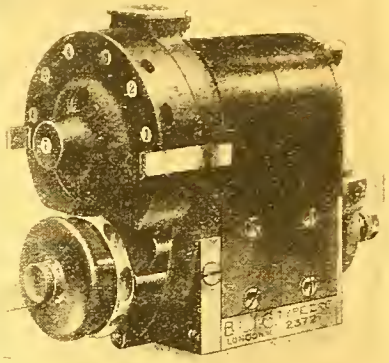

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TWO THOUSAND MILES ON A HUMBER FLAT TWIN.

AN EXHAUSTIVE TEST OF THE HEAVY WATER-COOLED MODEL.

MOST published experiences of flat twins refer to the smaller air-cooled variety. After considerable experience of both, I am of the opinion that, although both are excellent, the water-cooled machine is miles ahead of the air-cooled for heavy work. This particular machine was taken over from the works in June, 1917, fitted with a heavy Millford sidecar, and covered 2,000 miles before the petrol shortage compelled the owner to lay it up. Of this total distance, about 600 miles was expended on a holiday tour in Wales, and the balance was made up of week-end runs from the centre of England to the sea coast in search of fresh air after strenuous days and nights on munition work.

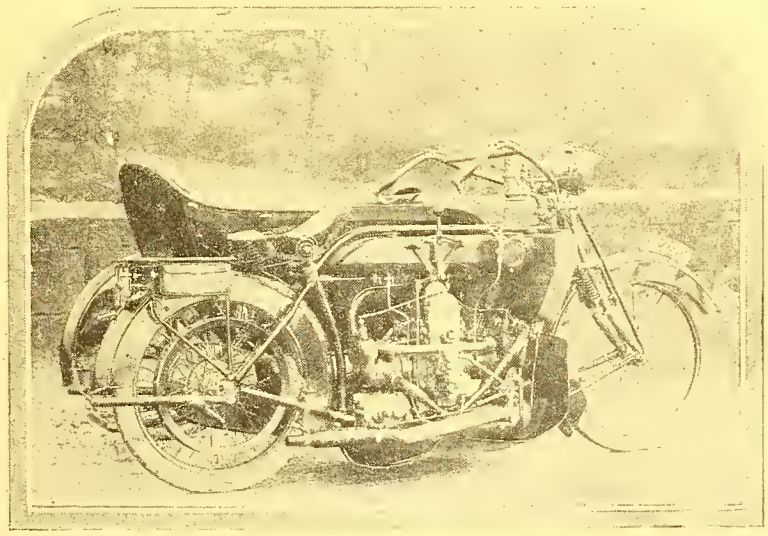
Wear and Endurance.

For the first 400 miles the machine was not pressed in any way, and was liberally oiled and well looked after, but for the remainder of the distance it was not spared at all. Indeed, on account of the brief time at my disposal for recreation, it was on numerous week-ends given a very severe gruelling, a distance of 300 miles on a Sunday being quite common for the out and home run.

It was fitted from the outset with a Bonniksen speedometer, an instrument with a Kew certificate, and an accurate record was kept of all expenses, including petrol and oil consumption.

During the spring, when no more pleasure riding was possible, I spent my spare time taking the machine to pieces and noting carefully the signs of wear, evidence of oiling and carbonisation, and such like matters, and the machine is now being assembled and greased to be laid up till the pleasures of motor cycling are again available.

One of the outstanding traits of the engine in use, and what distinguishes it in the writer's opinion from all other sidecar machines he has ever ridden, is its amazing capacity for hard and continuous work. After a gruelling day on the Welsh hills and mountain roads its vim and vigour are just as pronounced as when it was first purchased.



The 6 h.p. water-cooled Humber flat twin and sidecar.

This is a trait that no air-cooled engine can exhibit for long, and in my fourteen years' experience of motor cycling is as novel as it is remarkable in motor cycle engines.

On the last run undertaken before laying the machine up it was just as lively and vigorous as it was at the beginning of its career. Although a fairly heavy machine—320 lb.—its wear on tyres seems exceptionally light, and its petrol and oil consumption quite reasonable. The water-cooling is not in any way clumsy nor exceptionally heavy, and has given no trouble during the 2,000 miles. The only attention given to it was filling up before starting in the morning, the quantity required being about one pint per 100 miles' run. The radiator never at any time showed the slightest tendency to boil, even on very long hills in the hottest weather. The weight of water is 12½ lb.

Consumption and Luggage Carrying.

The tour in Wales was undertaken during the autumn of 1917, and as the petrol shortage was then beginning to be felt it was considered advisable to carry as much "juice" as possible on board.

A special carrier was made and fitted to the rear of the sidecar body—not to the chassis—so that it had the benefit of the sidecar springing. This was made large enough to hold four tins of petrol, and, as the tank holds 2½ gallons, we had thus 10½ gallons with us. One of the cans was refilled during the return journey, and we reached home with half a gallon to spare. The consumption worked out at fifty-one miles per gallon, and oil at 800 miles per gallon.

The luggage was packed in a leather bag on the carrier, and this, with a few spares and sundries in the locker of the sidecar seat, made the total carried 161 lb., plus passenger and driver, turning the scale at twenty-five stone — altogether a good load, though not an unreasonable one for a 750 c.c. engine.

During the first day on a very fine stretch of road between Shrewsbury and Oswestry the throttle was opened out, and forty-six miles per hour was easily obtained with this load, and, judging by the behaviour of the engine, could easily have been kept up. On reaching Harley

Two Thousand Miles on a Humber Flat Twin.—

Hill, near Shrewsbury, we descended to the bottom, and without any rest or even stopping the engine the machine was turned round and a clean ascent of the hill was made, the speed never falling below twenty-three miles per hour, and only second gear was used throughout. This hill has a certified maximum gradient of 1 in 6½ and is over half a mile in length. Several similar hills were negotiated in the same way, but as the gradient of most of them is not known by the writer no test of speed was made on them.

General Review.

It should perhaps be mentioned here that no tuning of the engine had been attempted since it left the works till it was dismantled this spring. The only adjustments made were taking up the rear chain once and fitting a new washer to the inlet pipe joint of the rear cylinder—surely a good record for 2,900 miles' running.

As already stated, the wear on tyres is very light. Those fitted by the makers are Dunlop heavy Voiturette, and the back wheel still shows the studs standing up quite plainly, and, as the tyre is still perfect at the beads, 3,500 miles can be expected in all before the tyre is worn out.

This is undoubtedly due to the beautifully smooth running of the engine with its regular impulses, together with the shock absorber embodied in the rear chain wheel. When this shock absorber was dismantled the travel of the inner and outer parts could be plainly seen in the grease on the working surfaces, and the brightness of these latter showed plainly that the device is constantly at work, if the little wear of the tyres were not in itself sufficient evidence of this.

The removable rear wheel proved a great boon when the puncture fiend troubled, as it can be easily removed in forty seconds and replaced as quickly. The engine when dismantled showed no sign of wear at all: the valves were not pitted and the exhaust valves were no more discoloured than the inlet. The seats were quite good and tight. There was only the very slightest carbon deposit on the piston tops and the cylinder heads, and this was so soft that it was easily scraped away with an old knife. The rings were quite free and well covered with oil, as were the cylinder walls and piston skirts.

A separate sump, fed by a drip feed oiler of the usual type, is provided for each big end to dip into. Ball bearings are fitted to the crankshaft and the half-time shaft, and these, of course, showed no signs of wear. Altogether the state of the engine internally showed that the oil consumption given above—which, by the way, includes the oil used for the gear box—could without danger be reduced to 900 miles per gallon, or possibly 1,000 miles without any risk whatever. The gear box was quiet in use, and when dismantled showed no defects or wear, and the dogs on the clutch wheel were quite sharp and perfect.

The clutch is of the dry plate variety, with the rings faced with "Ferodo," and was as good as new. It gave no trouble at all, and was not even adjusted until it was dismantled. The chains showed practically no sign of wear.

The C.A.V. magneto, which is the first British magneto the writer has used, gave no trouble, and he has nothing but praise for it. The roller action of the contact breaker is much superior to the Bosch rocking arm, as there can be no possibility of its sticking up due to damp—no lubrication is required, as the ball bearings to the armature shaft are packed with grease when the magneto is first assembled.

The front fork links—a point which the writer knows from hard experience gives trouble on most sidecar machines—showed no signs of failure or of giving trouble. The fork bearings for the link pins are bushed with hardened bushes and hardened washers are fitted inside the links themselves, and no adjustment could be made. This is a point that has received scant attention in the past from designers of sidecar outfits, and is, therefore, all the more noteworthy on a heavy machine.

The metal guard fitted under the engine is a most efficient device, extending as it does from just below the bottom of the radiator, right along under the engine as far as the rear mudguard, and while of ample size is never in the way, nor does it look clumsy.

The arrangement of the starting handle on the end of the half-time shaft ensured easy starting at all times. The silencer is of ample size, and is fitted with a long tail pipe leading into an expansion chamber. This arrangement gives the exhaust a beautiful note combined with a good degree of silence, but makes the silencer too efficient to perform one of its functions.

Criticisms.

The front rim brake—like all of its kind—is useless and only answers one purpose, "a bobby dodger." The front mudguard is too long in front, making the removable front wheel difficult to get away after it is detached from the forks.

The undershield could with advantage be fitted at least 1in. higher. The chain case could be much improved where it fits over the rear chain wheel. In order to enable the inner side of the case to clear the bolt heads on the side of the shock absorber, the inside hole in the case is made large, with the result that road dust blows into the case and gets over the rear chain.

The carburetter fitted is a "Longuemare" of the single lever variety, having a pilot jet for slow running, and a reserve chamber to draw on when the throttle is opened out on a hill, somewhat like the principle used in the Zenith car carburetter. It is fitted midway between the cylinders to a short union on the lower side of the long induction pipe which extends from the front inlet to the rear inlet. An aluminium heating box, having a branch pipe from the silencer conveying hot gases to it, is fixed over this pipe, just at the junction with the carburetter. The silencer is very efficient as an extractor, with the result that at speeds below twenty miles no hot gas is diverted to the heater box on the inlet pipe at all, though above this speed there is quite enough gas supplied to warm the heater, and at 30 m.p.h. the induction branch is quite hot.

Owing to the inadequate supply of heat at low speeds the inlet pipe became so cold that the petrol vapour condensed again before reaching the cylinders, and at speeds of seven to eight miles the engine would sometimes die out altogether from this cause, particularly if the weather was very cold. J.M.

CURRENT CHAT

Times to Light Lamps.

GREENWICH TIME.

Oct.	10th	.. ...	5.47 p.m.
,,	12th	... ...	5.43 ,,
,,	14th	... ...	5.39 ,,
,,	16th	... ...	5.35 ,,

The Prince of Wales's Fund.

The Prince of Wales's Fund has reached a total of £6,443,479. Of this sum £3,897,680 has been allocated to date for distribution for relief.

Cinema Motors on Tour.

The first ten cinema motors of the National War Aims Committee have started on a tour of England, which will last throughout the autumn and early winter. Three thousand meetings have already been arranged.

The Industrial Reconstruction Council.

The second lecture of the series arranged by the Industrial Reconstruction Council will be held in the Saddlers' Hall, Cheapside, E.C.2, on Wednesday, October 16th, at 4.30. The subject is "Principles of Reconstruction." The lecturer will be the Rt. Hon. Christopher Addison, M.D., M.P., Minister of Reconstruction. Applications for tickets should be made to the Secretary, I.R.C., 2 and 4, Tudor Street, London, E.C.4.

Fined for Carrying a Passenger.

In Providence, R.I., a youth of seventeen years of age was fined £3 for allowing a passenger to interfere with the control of a motor cycle. The police stated that the driver had allowed a girl to sit on his machine between him and the handle-bars. The judge stated that a person so situated could not properly control a motor cycle in an emergency. As it happened there was an accident, the machine hitting a passenger alighting from a tramcar.

National Cycles.

From St. Etienne, France (a town where small arms are made), comes the news that a discussion has taken place between the Minister of Munitions and an industrial group in that town respecting the construction of a "national bicycle." The idea is that a standard model should be constructed from materials released by the French Government, to be sold at a standard market price, and the profits to be limited.

Doubtless the suggestion is a sound and lucrative one for those who are interested, and would possibly lead to big business, but to suggest that all cycles should be made to a Government standard would be to stifle competition, enterprise, and quality of design.

The same argument applies more particularly to motor cycles than to pedal cycles. If it is only a war-time expedient, it might reasonably be received with seriousness, but to contemplate it as a business move shows that at the source from which it arises the question cannot have been studied sufficiently, or ulterior motives are at the back of it. Standardisation is a good thing in certain parts, but to suggest manufacturing a delicate piece of mechanism like a bicycle on the same lines as pots and pans is, as we have said before, a retrograde step, and one likely to stifle instead of increase commerce.

Motor Cyclists in the U.S.A. Army.

The U.S.A. War Department is ordering from 5,000 to 6,000 motor cycles, which are to be split up between the Indian and Harley-Davidson factories, whose machines are well known in this country. An American journal states that the U.S.A. Government want 15,000 motor cycles, but cannot yet get them.

Overseas Trade.

In order to prepare for the development of the export business of the engineering industry, the British Engineers' Association has arranged for an investigation of the conditions of and the prospect for the engineering trade in Brazil. The Department of the Overseas Trade has intimated to the Association that the Treasury will contribute half the cost.

Special Features.

BRAKING SYSTEMS.

THE BEST TRANSMISSION SHOCK ABSORBER.

2,000 MILES ON A HUMBER FLAT TWIN.

Fancy Driving.

One day last week the W.R.A.F. motorists—cyclists and sidecarists—had a little exhibition of fancy driving in figures of eight and all sorts of extraordinary devices. The exhibition took place in the Kingsway district, where these lady drivers may be seen to the best advantage. It is to be hoped that the surface on which the driving took place was rather better than that in Kingsway on the day in question, for it was almost dangerous to cross the road on foot, so greasy was it, and 'buses and taxis went up and down the road sideways for the most part.

Official Lecturer.

Lt. J. C. Percy, R.N.V.R., of the firm of Mecredy, Percy and Co., Ltd., publishers of the *Motor News* and the *Irish Cyclist and Motor Cyclist*, is now in America as official lecturer for the Ministry of Information on the subjects of naval pictures recently exhibited in Prince's Gallery, London. He is also speaking on "The History of the Royal Navy" and "A Visit to the Grand Fleet," both of which lectures are well-known in Ireland. The object of his visit is to bring to the notice of the American people the vital part which the British Navy has played in the war.

A despatch rider and cavalry passing through a wrecked village on the Western Front.

A Useful Tip.

A member of our staff recently had the misfortune to snap the fastener link of the belt on his two-stroke. As this occurred in the country, it looked very much like a long tramp. Fortunately, he had some strong twine in his pocket, and three turns of this made a remarkably good substitute, and held up till he reached his destination.

New Government Vehicle Order.

The Local Government Board has issued a special order by arrangement with the military authorities regarding the use of special numbers on motor vehicles belonging to the Government, or the U.S.A., or Dominion of Canada. Each vehicle is to bear a number followed by an initial letter or letters indicating the particular service to which it belongs. The drivers are also to be provided with special identification cards.

Technical Motor Journals.

Our sister publication, *Motor Traction*, has since July, 1917, maintained the distribution of technical and motor papers to the A.S.C., M.T., Overseas. Parcels have been despatched each week to the units in France, Egypt, Salonica, and Mesopotamia. Possibly many of our readers have accumulated back numbers of technical journals dealing with the motor and engineering industries, and may care to send these to the various fronts. There is no distinction as regards the papers that are forwarded, and all technical journals dealing with motoring and engineering are welcomed by the troops.

Parcels should be sent, carriage paid, to the Business Manager, *Motor Traction*, 20, Tudor Street, London, E.C.4.

Petrol's Formidable Rival.

The latest American invention is an engine which generates its own power from oxygen extracted from the air. There is no running cost once it has been installed. Surely the motor millennium!

An Incentive to go Forward.

The Belgians were always enthusiastic motor cyclists, despite the fact that their roads were, in the main, exceedingly bad before the war. They built several good machines of their own, among which, of course, the famous F.N. stands pre-eminent, and they had a distinct liking for English mounts.

Mr. Beach Thomas, in one of his excellent despatches the other day, writes as follows: "Looking down from the spurs of Passchendaele Ridge, many towns appear at our feet, speaking strategically—Courtrai, Thourout, Roulers (where a Belgian acquaintance of mine hopes to find a motor cycle that he buried four years ago), and even Ostend."

Doubtless many good Belgian and British machines belonging to our Allies have been safely hidden awaiting the happy day of liberation to that much-stricken little country. Let us hope that the Huns have not unearthed them from their safe retreats.

In our issues of September 17th and 24th, 1914, we published an article telling of a motor cyclist who had escaped from Germany into Belgium, and thence returned to his home in South Wales. He concludes: "I have only one regret. My poor motor cycle (a Scott), to which, besides my life, I owe three of the best days' sport I have ever had, is still in Brussels, and though it is stored away in a cellar, I tremble when I think of it, defenceless in a city held by the enemy."

Motor Cycling a Cult.

Motor cycling in its broadest sense is something more than owning and using a motor cycle. It is almost a cult, of which the actual possession of a machine does not necessarily form a part.

The Keeping of Motor Cycles.

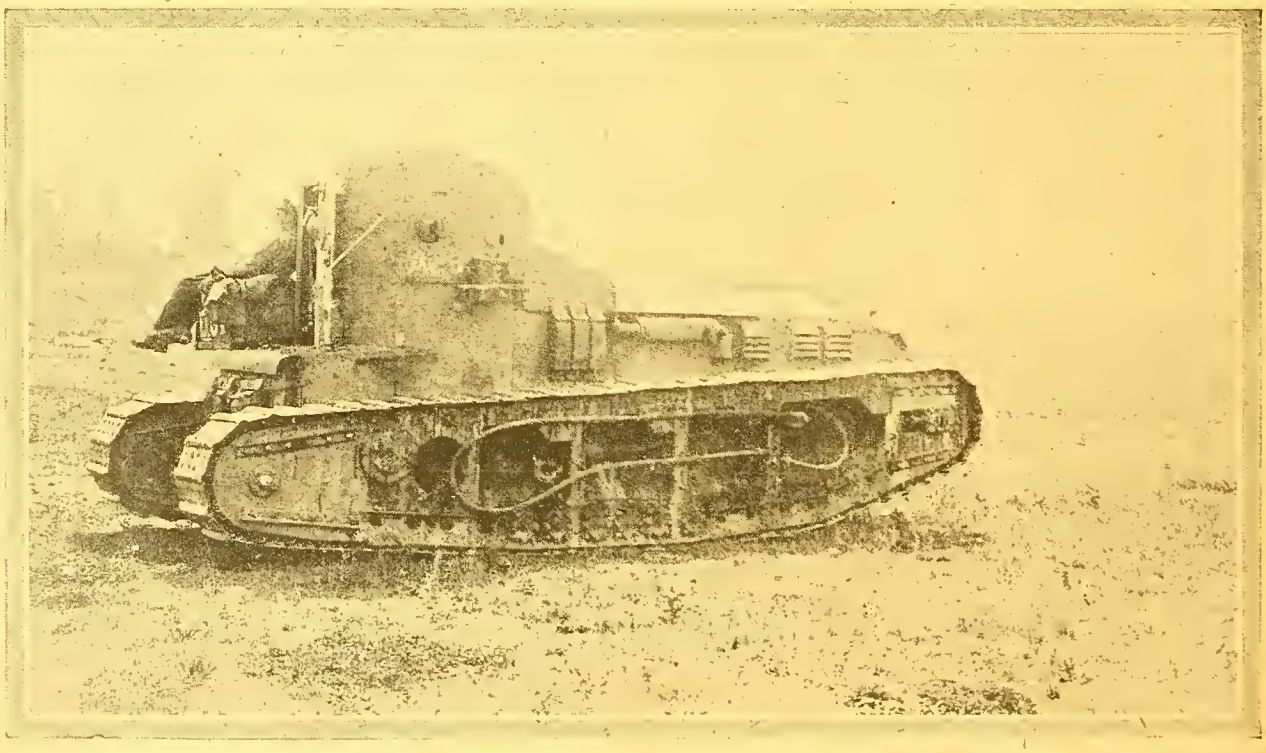
We are officially informed that the statement concerning the keeping of motor cycles (Regulation 9 AA, Defence of Realm Regulation), mentioned in last week's issue, concerns Ireland only.

Water Injection?

An amusing incident occurred in a well-known motor cycle maker's test shop recently. A water-cooled engine was under test, and all efforts to start it up were in vain. It was left on the test block during the dinner hour. Unfortunately, there was a leak through the cylinder wall, and by the time the testers returned a good ¼in. of water had collected over the piston head. This time it did start, and with a vengeance. The testers got the surprise of their lives.

Justice?

A particularly glaring case of misdirection of the Petrol Restriction Order is exemplified in the fining of a village postmaster £3 at Longton for using his sidecar outfit, for which he was allowed a gallon a month, for the purpose of travelling from his post office to his rooms in an adjacent town on a Sunday. He had made this journey every week-end for the past fourteen years, taking with him his linen, etc., and quantities of eatables. To get a train meant a six-mile walk. This is just another instance of the evils of leaving an ambiguous Order to misconstruction by the local police authorities.



The terror of the Boche—a whippet tank on duty. A unit of one of the most effective arms of the Service.

THE MOTOR CYCLE

AVIATION SECTION

Distinctions for Flying Heroes. The Influence of the Motor Cycle.

Flight-Commander C. P. Brown.

Flight-Commander C. P. Brown, awarded the D.F.C., bombed an enemy seaplane base by night, afterwards bombing an aerodrome and destroying an enemy aeroplane. On his return fifty-nine bullet holes were found in his machine. He has since destroyed two more enemy 'planes.

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Journalists in the Air.

Describing his first flight as a passenger in a Handley-Page bomber over London, a journalist says: "In the course of the flight I noted many interesting things which I did not know before; but of 'sensations,' the occasion produced no more than when I took my first taxi or when I boarded a motor 'bus for the first time."

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The Feeling of Detachment.

He continues: "From beginning to end there was no sense of fear, though when we were up at 3,000ft. the thought did cross my mind that if that remarkably steady 'bombing 'bus' did meet with an accident we should make a very nasty mess on some housetop or public thoroughfare."

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Rewards to Members of R.A.F.

The King has conferred the following rewards on members of the Royal Air Force:

BAR TO D.S.O.

Lt. (Temp.-Maj.) R. Collishaw, D.S.O., D.S.C., D.F.C. (late R.N.A.S.), a brilliant squadron leader, who has destroyed fifty-one enemy machines.

Lt. (Hon. Capt.) B. A. Smart, D.S.O. (Sea Patrol), who led his flight for 150 miles over sea and land, and destroyed by bombs an important enemy airship shed. This service was carried out under exceptionally difficult circumstances, requiring great skill.

D.S.O.

Capt. (Temp.-Maj.) D. E. Stodart, D.F.C. During a period of twenty-one days he was thirty-seven hours in the air, performing the duties of an entire flight, all his officers being incapacitated. He dropped 115 bombs, exposed 326 negatives, and acted as observer for 163 rounds of our heavy artillery.

BAR TO D.F.C.

Lt. W. G. Claxton, D.F.C. Recently in one day he destroyed six enemy aeroplanes—four in the morning and two in the evening.

Lt. (Temp.-Capt.) G. E. H. McElroy, M.C., D.F.C. He has destroyed three enemy kite balloons and forty-three machines, accounting for eight of the latter in eight consecutive days.

Trench Capture by a Pilot.

An R.A.F. pilot and observer recently captured sixty-five Germans from a trench.

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Aircraft Production Appointment.

The Minister of Munitions has appointed Mr. A. E. Berriman, chief engineer of the Daimler Co., to be Deputy Controller of the Technical Department of Aircraft Production of the Ministry, in succession to the late Professor Bertram Hopkinson, F.R.S.

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Motor Cycles and Aeroplanes.

It is almost safe to assume that every airman is or has been a motor cyclist at some time, though, of course, this may not be true in the future, now that the free use of motor cycles has been restricted for some time. Still, motor cycling helped the present airmen, and those who came before them, giving them the requisite nerve and quickness of judgment so essential in flying. It also helped them mechanically in being able to understand their engines. "Contact," in his wonderful book, "An Airman's Outing," gives a good example of this: "The Flight-Commander, just an ex-civil servant, was a man of resource, and suggested that mirrors as used on the handle-bars of motor cycles to give warning of roadcraft in the rear might be valuable to aeroplanes. Forthwith he secured one on to the sloping half strut of his top centre section. The trial was a great success, and an investment which was to pay big dividends in many an air fight."

D'Annunzio to Fly in France.

Gabriele d'Annunzio, the Italian poet-airman, is, we understand, to fly in France with an Italian bombing squadron which is operating in that country. He will take part in bombing expeditions against German military objectives.

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Seaplanes and Flying Boats.

The lay press does not seem to have realised that seaplanes and flying boats are distinct types. The Sunday papers particularly make blunders in this respect, and under the illustrations of flying boats generally describe them as seaplanes.

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The U.S. Army Air Service.

The work of the U.S. Army Air Service is in the highest degree creditable to all concerned. Their Commander, Col. Mitchell, has issued a statement that on one day recently they brought down sixty enemy machines and burnt twelve observation balloons without suffering a single casualty.

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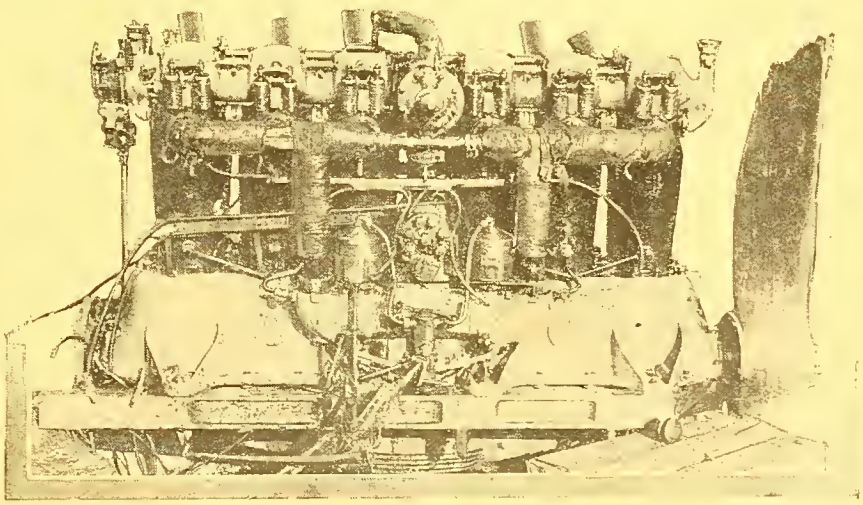
British Aces.

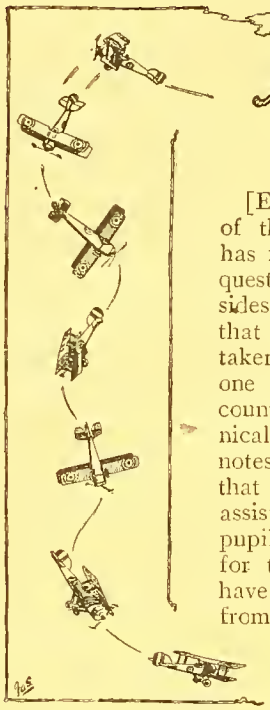
The *London Gazette* publishes the following records of British pilots who have brought down enemy planes at the Front:

Capt. Cummings	...	100 planes
,, Dickson	...	60 ,,
,, Hayne	...	48 ,,
Lt. Christian	...	47 ,,

The names of a dozen other pilots are also given, of whom the last has eleven Boche planes to his credit.



A six-cylinder Austrian aero engine which was fitted into a new type of Austrian aeroplane brought down recently by a British airman.



SPINNING AND SIDE-SLIPPING

INSTRUCTIONS FOR BEGINNERS,

[EDITOR'S NOTE.—The author of these few notes, although he has made a thorough study of the questions affecting spinning and sideslipping, desires us to state that the following must not be taken as a complete solution of one of the many problems encountered when studying any technical point in aeronautics. The notes are merely written in the hope that they may be of some little assistance to some of the many pupils now undergoing instruction for the Royal Air Force. They have been compiled by the author from practical experience and information gathered whilst serving as a pilot in the Royal Naval Air Service during 1915.]

SPINNING generally arises from *sideslipping*, of which I propose to give a short explanation to help the reader to grasp thoroughly every point in these notes.

Sideslipping can usually be traced to *overbanking*, which has a considerable diminishing effect upon the flying speed of an aeroplane, because the lifting surfaces of the planes do not engage the air at the correct attitude. The result of this loss of speed is that the machine loses headway and sideslips, and, if the bank is excessively heavy, probably becomes unmanageable. To prevent any loss of flying speed when banking, the pilot should always put the nose of his machine down slightly before exerting any pressure on the rudder bar. If, however, his machine is already on a heavy bank, the action of putting the nose of the machine down will be brought about by operating the rudder bar in the direction of the slip.

Finding the Banking Limit.

This results in the higher wing tips—that is the wing tips on the outside—gaining still greater velocity, and consequently obtaining more lift. This at first appears absolutely contrary to the position in which the pilot is endeavouring to get his machine. but this action in reality places the plane surfaces in their correct attitude, and the controlling surfaces are then able to be worked efficiently.

When piloting a new machine a pilot must endeavour to discover the banking angle at which the lift ceases and the machine begins to fall. All machines, whether of the same type and design or not, have their peculiarities, but this angle is very easily discovered by "feeling" the machine gently over on a bank. As soon as the angle of limit is reached the machine will commence to sideslip inwards, and the nose must be dropped to remedy the slip. It must be remembered that a machine (unless it is wrongly designed or trued up) is *always under control* if the plane surfaces are engaging the air at the angle at which they are designed to do so.

I recommend the very simple string "tell-tale" which many pilots use on their machines. A small piece of string or coloured ribbon about six inches in length is tied in the centre of the machine directly in the front of the pilot where the cross-bracing wires of the rear centre section struts cross each other. This will always prove an infallible guide to the direction of motion of the machine during the daytime.

Checking Inward Sideslip.

I have stated above that a machine is always under control when the plane surfaces are engaging the air at the correct angle. There is, however, one particular instance when this is not so, viz., when the machine is in a "vertical dive." The above is only *one* example of how a spin may occur, viz., through "overbanking." There are, however, several other causes of machines spinning, and, in order to consider the problem properly, it must be studied from several different points of view.

First, from the point of view of the stable machine, and, secondly, from the point of view of the unstable machine. These two points are affected by a third point, viz., whether the speed of the machine is correct or not.

An example of sideslipping on a stable machine with the speed correct has been fully explained above (viz., overbanking). In the case of a *stable aeroplane with speed too slow*, first considering *outward sideslips*, it is possible that:

(1.) The rudder reaction may be too strong for the pilot to master it.

In this case if the machine sideslips the rudder should be held straight firmly.

(2.) The operation of the wing controls at extreme slow speeds may produce spinning tendencies. In this case it is best to throttle down the engine and dive for speed recovery. *Inward sideslips* on a stable machine with speed too slow generally occur through "stunt" flying when the machine may be unwittingly held on a bank with the rudder in a straight position. The pilot's best course is to cut out the engine and hold the rudder over in the direction of the sideslip—then dive. As soon as the machine is moving almost vertically downwards the rudder should be kicked straight and the machine gently flattened out.

N.B.—This procedure has already been tried in the air and the sideslip soon checked.

The Case of the Unstable Machine.

We have now considered the case of the stable machine, and will turn to the unstable machine, which naturally is very much more prone to sideslip. First considering the *unstable machine* which is being flown at too slow a speed, when a spin occurs it is possible that:

Spinning and Sideslipping.—

(1.) The fin surface alone or the fin surface *plus* rudder surface may be inadequate.

(2.) The total fin surface may be excessive.

(3.) The rudder surface *only* may be excessive, causing a big reaction too strong for the pilot to control.

(4.) The operation of the wing controls at very slow speeds (as in the case of the stable machine) may produce spinning tendencies.

(5.) The fin surface may be unsymmetrical above and below the body of the machine.

In (1) the pilot should hold his rudder straight firmly and dive.

Case (2) is most unusual, and would probably only be brought about by adding to the fin area the area of the rudder, which is supposed to be held rigid.

The rudder should be released for a moment and the machine dived. The machine will then realign itself and become controllable again.

In the fourth case the only occasion on which a spin can occur is when an underbanked turn is made presumably on account of the machine being too near the ground. The mere fact that there is a spin tends to raise the outer wing, which is revolving at a much greater speed.

Remedy: Pull the outer aileron down. This will certainly cause a much more rapid spin for the moment, but it will tend to put the machine on its proper bank and thereby retard the spin. If there is insufficient ground clearance to follow out the procedure there will probably be a smash in any case, and it is accordingly better that the engine be switched right off so that all danger of fire may be avoided.

The *fifth* case usually only applies to small scouting aeroplanes having large engines in relation to their size, the slip-stream of the propeller affecting the fin surface and creating a bank.

Lastly, we have the case of the unstable machine being flown at the correct flying speed. The only way a spin can occur is by the fin surface aft being wrongly disposed.

Judging Flying Speed.

The flier's best course is to throttle down his engine and dive for speed recovery, at the same time holding the rudder appropriately (the straight position is generally the best).

A pilot, after reading through the above, should remember the following:

(1.) Never fly a machine which is practically at "stalling" speed. Watch the instrument board.

(2.) Do not put too heavy a bank on any machine unless the flying speed is raised accordingly to counteract the effect.

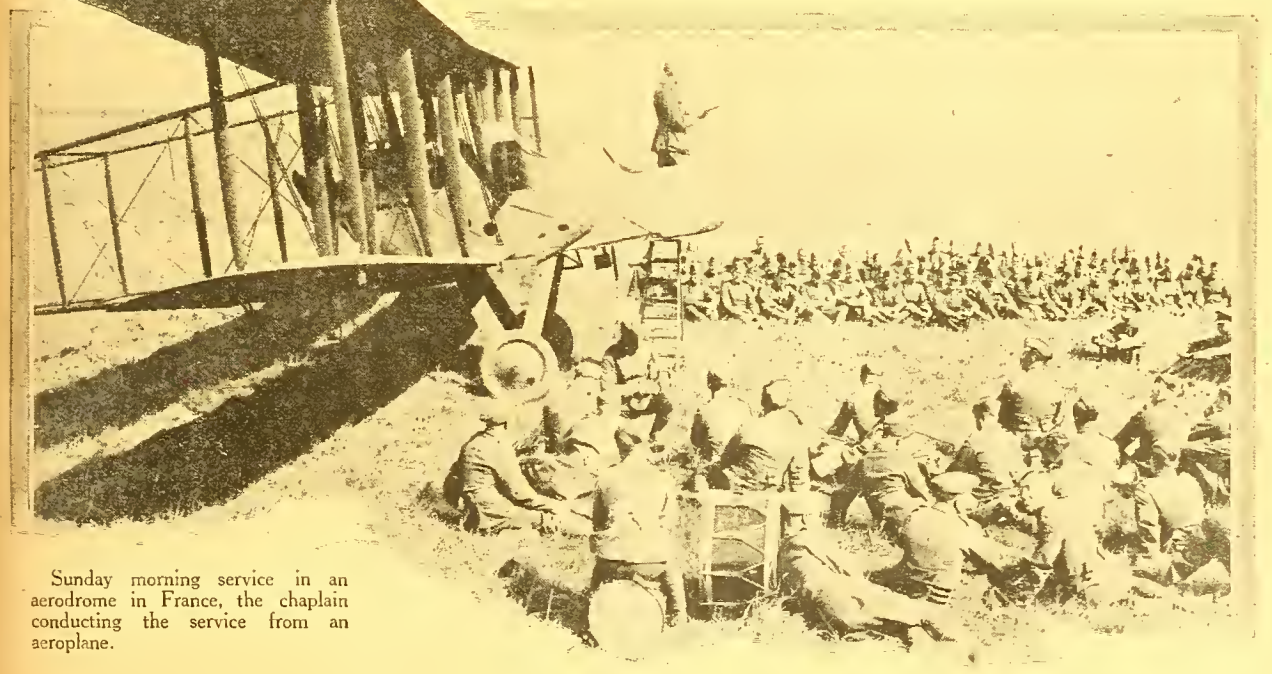
(3.) Do not confuse "air speed" with "ground speed."

To illustrate my last point more clearly, take as an example a machine with a minimum "flying speed" of forty miles per hour—that is to say, if the machine is flown under 40 m.p.h. it will stall.

Imagine for a moment that this machine is travelling against a "head wind" of 20 m.p.h. The "air speed indicator" registers 40 m.p.h., the actual "ground speed" being 20 m.p.h. This is quite in order; but suppose the machine is turned "down wind," it is only just safe at a "ground speed" of 60 m.p.h. (*i.e.*, 40 m.p.h. *plus* 20 m.p.h.), and, although the machine may appear to be travelling at a very much higher speed, it is in reality only just keeping within the stalling limit of 40 m.p.h.).

My own personal opinion is that the instrument board is by far the best guide for judging correct flying speed, although some instructors debar the use of instruments whilst a pupil is under instruction in order to make him independent in emergencies.

G. H. BETTINSON.



Sunday morning service in an aerodrome in France, the chaplain conducting the service from an aeroplane.

"PLANE TALES FROM THE SKIES."

A Well-written and Interesting Book of Yarns by a Practical Flying Man.

A BOOK such as "Plane Tales from the Skies," by Wing Adjutant, is a rarity. The writer, who is well-known as a contributor to the daily press, obviously knows whereof he speaks, and the couple of dozen little stories which compose the book are as vivid and arresting as anything of the kind that I have read.

One story in particular, "Out of Line," is most engaging. It tells of a pilot's "bad day," when things went wrong from the start. To commence with his engine was sullen, and jibbed, and then when he had got his altitude it began to sputter, with the result that he fell out of formation, and had to turn home. As they neared the aerodrome the refractory engine picked up, until the rev. meter showed a normal figure. With questionable wisdom he turned back towards the enemy lines, finally sighting the rest of the formation. Everything seemed to go well, and he deposited his bombs where they would do most good, when the engine missed once more, and finally the propeller, whirling lazily, stopped.

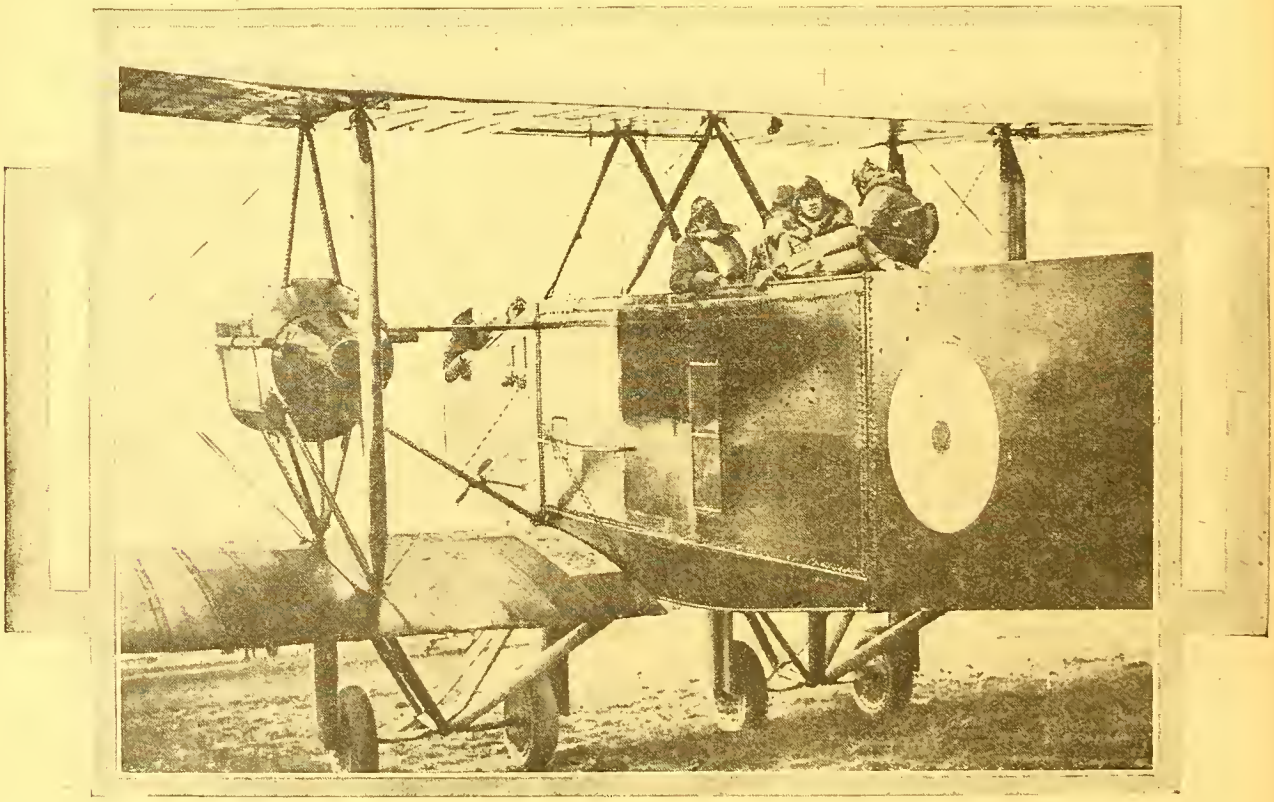
He and his observer had to land in a Hun aerodrome, and managed to set their machine alight with a Véry pistol. Rapidly they were disarmed, and brought before the Squadron Commander. As they were not found communicative, the order was given to lock the two up for the night. A little later, to their surprise, an orderly brought in an invitation to dinner. The evening began well, but when the wine had circulated freely, disparaging remarks were made about the British air service, which provoked cheers. The two Englishmen drank very little, and they could not but notice that the Equipment Officer who had taken charge of them when they landed was watching them very closely. When most of the others were far gone in slumber or drink this man came over to them. Rapidly, in a low voice, he explained to them that his wife was in England, and that for months he had been unable to communicate with her. If they would take a message he would secure their freedom.

They said nothing, fearing a trap. He produced a key that fitted the lock of their shed, and gave them curt instructions, to the effect that when they heard an engine, which would be started up near them, stop, they were to let themselves out, overpowering their guard. After they had been escorted back to their shed they discussed the matter, and decided to take the slim chance. They heard the roar of a big Benz breaking out. It stopped. Quickly they stunned the sentry with his own rifle. The pilot fingered over the strange controls, while the observer spun the propeller.

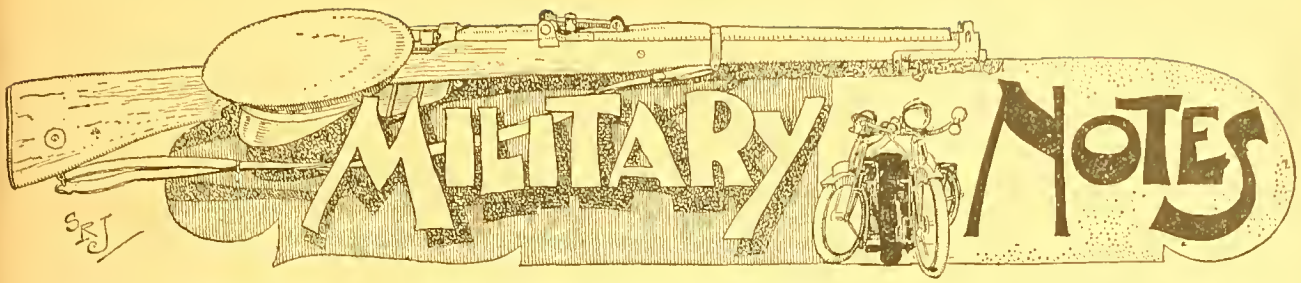
A moment later the "Tr-t-t-t" of a machine gun opened up, but they were speedily lost in the darkness, steering by compass; they got home, having some little difficulty in making themselves known on their arrival in the Hun machine!

This book is published by Messrs. Cassell at 2s. 6d.

R.H.B.



A group of Allied "Press Tour" journalists about to cross to France in a Handley-Page aeroplane.



Looking after the Overseas Men. Motor Machine Guns and Tanks busy.

AMERICAN INDUSTRY.

DURING August, 34,447 machine guns and 263,989 rifles were manufactured in the United States.

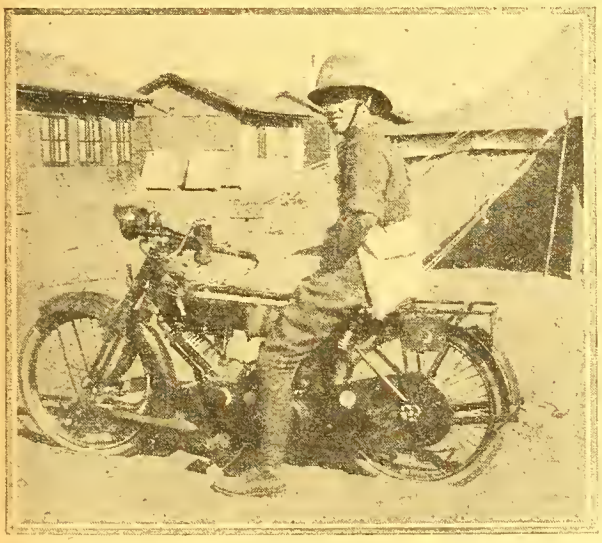
LEAVE FOR MEN ON ACTIVE SERVICE.

WE learn that the Army Council has made arrangements whereby men on active service in France, Egypt, Macedonia, Mesopotamia, India, and Palestine will now have a better opportunity of seeing their relatives than heretofore.

CONSPICUOUS BRAVERY ON A MOTOR CYCLE.

THE King has been pleased to approve of the award of the Military Cross to the following officer in recognition of his gallantry and devotion to duty in the field :

T.-Lt. (A) Capt. O. Behrendt, R.E.—During an enemy advance he was sent forward on a motor bicycle in the direction of two villages to obtain accurate information of the enemy, which he successfully did. Later in the day he was sent forward again, and found both villages one after the other occupied by the enemy, who fired upon him with machine guns and rifles. Before returning, however, he completed his reconnaissance, and brought back valuable information.



One of the R.A.F. despatch riders with our victorious troops in Palestine.

THE M.M.G.C. AT IT AGAIN.

REUTER'S despatch, published recently, contained the following bit of information of the work of the *protégés* of *The Motor Cycle:*

"By 7.30 we had broken apparently right through the famous Drocourt-Queant line, which, with its wire belts and five rows of traversed trenches, forms a system little less than 2,000 yards in depth. We had done this nearly everywhere along the front of attack.

"Two hours later it was rumoured that groups of our motor machine gunners had been seen upon the bank of the Nord Canal, which lies nearly five miles east of the nearest point of the Drocourt line. These groups, of course, are only highly mobile patrols, pushing out to try and seize bridge heads and destroy communications. But if they have got on so far it proves the success of the opening attack."

SEC.-LT. T. COATES, A.S.C.

SECOND-LIEUTENANT T. COATES, A.S.C. (whose photograph as a private we reproduce), will be remembered by many as an enthusiastic competition owner-driver of Royal Enfield sidecar outfits. He figured before the war in many long-distance reliability trials, and was a member of the Competition Committee of the sporting Middlesex M.C.C.

He took a commission as a pilot in the R.F.C. at the beginning of 1916, but a serious accident on a 3½ h.p. Sunbeam in August of that year compelled a return to civil occupation. In January, 1917, Lt. Coates joined the Technical Branch of the Trench Warfare Department of the Ministry of Munitions, and during his varied duties as supply officer he was responsible for millions of fuses for the well-known Stokes trench mortar, and produced a percussion fuse of his own design.

1918 saw Lt. Coates again restored to health and still dissatisfied with civil life; with the result that he resigned his post at the Ministry and joined the ranks of the Army Service Corps as driver in the mechanical transport, afterwards gaining a commission in the corps.

Lt. Coates has been in France for some months, and is in command of a section of Albion 3-tonners attached to the G.H.Q. of one of our numerous armies. He has,

Sec.-Lt. T. Coates, A.S.C.

we understand, met several old friends Overseas, including Capt. Jack Mills, R.A.F., a letter from whom was published in our columns.

THE TANKS' GREAT DAY.

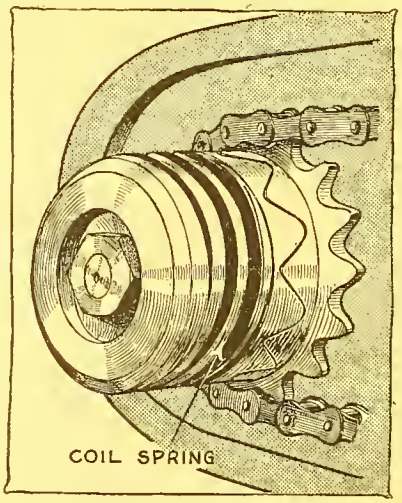
MR. W. BEACH THOMAS, the *Daily Mail* war correspondent, says :

"The Tank Corps, though represented in small numbers, had one of its great days recently. Tank commanders had cunningly steered their cars up both sides of Bourlon Wood, which sides were already roughly but efficiently shaved by our guns, and they knocked out machine guns all the way. I traced their course, especially round a wide quarry at the edge of Bourlon village, where they had knocked down and trampled on a stiff wired fence, and then raked the interior of the quarry. I had seen similar evidence of their work earlier, immediately after crossing the canal, with its sloping brick sides, which our men had scaled, only to see the enemy running for all he was worth. But all had not escaped: the grim evidence of that was everywhere."

The Best Type of Transmission Shock Absorber.

WITH SOME SUGGESTED DESIGNS FOR SHAFT DRIVE.

SOME considerable time ago, in an article dealing with the necessity for mechanical shock absorbers when a rigid system of transmission is employed, I advocated the use of a large friction device in the rear wheel sprocket with external thumbscrews for immediate adjustment. "Wharfedale," commenting upon my notes, pointed out that such a device would entail considerable expense in manufacture, and dwelt upon the efficiency of the American system embodying a good clutch, the degree of engagement of which can be varied so as to permit a certain amount of slip when required.



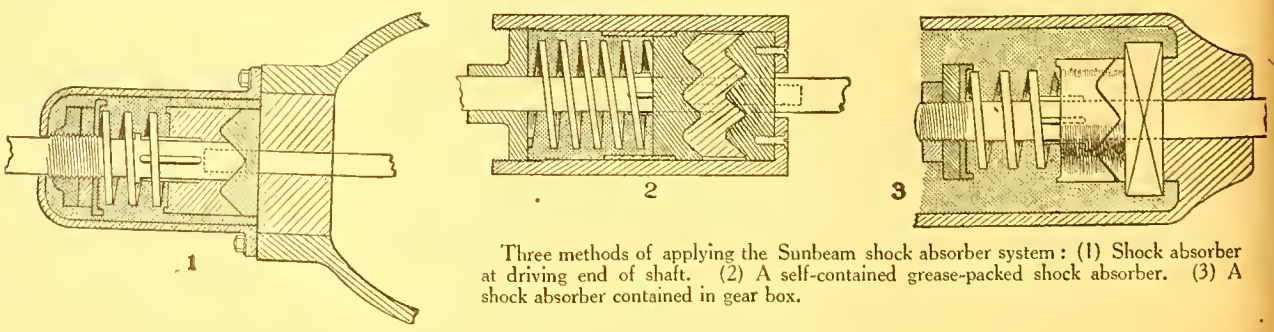
The Sunbeam shock absorber, a well-tried spring friction device.

Since all this transpired I have ridden various chain-driven machines, American and British, twins and singles, the majority without any shock-absorbing device whatever other than the clutch, and the experience has left me still more fully convinced that an independent shock absorber, functioning at all times, is highly desirable with any type of engine. To realise its real necessity one has only to examine one's wheel tracks on a wet day, and it will be seen that every thrust of the engine is conveyed directly to the tyre at any speed up to 35 m.p.h. with a twin, and sixty, if you like, with a single. I know of one firm that recently has been experimenting with chain-driven models. The machine (a single without shock absorber) was taken out on a wet day, and the tester returned with the pronouncement that the solid transmission was perfectly sweet, and that no shock absorber was required. When next the machine was taken out the roads were dry, with the result that the sprockets sheared their keys after a few miles of fast riding. One can imagine, then, the unnecessary wear and tear that was taking place throughout the transmission, engine, rear tyre, and, indeed, the machine in general, though the rider was unaware of any real harshness, and similarly, when depending solely upon the clutch as a shock absorber, the wear and tear is going on practically the whole time, though one is unaware of it till it becomes extreme. The heavier the machine the less one feels the harshness, and when finally one is reminded to ease the clutch the damage is already well under way.

A Cycle Car Parallel.

Yet another example. Some time ago I possessed a very sporting cycle car, having a big V engine and solid drive to the back axle. In place of a differential each of the rear wheels was fitted with a large friction shock absorber, which also functioned to soften the drive—the idea being that one could run alternately with one shock absorber slack and the other tight, so as to equalise tyre wear. In wet weather I found it advisable to run with both shock absorbers screwed up tightly, but whatever the adjustment it was impossible to induce the wheels to do an equal proportion of the work. One could fiddle with the adjustment till further orders, but always one wheel or the other did all the driving, as was indicated by the track, which proved that, if one shock absorber was the minutest portion of a turn slacker than the other, even though they were both almost solid, the slack wheel was spared the keen edge of the hard work. Finally I locked the whole lot solid, and proceeded forthwith to break spokes galore.

This, then, goes to prove the extent to which a shock absorber functions, even though it be very keenly adjusted.



Three methods of applying the Sunbeam shock absorber system: (1) Shock absorber at driving end of shaft. (2) A self-contained grease-packed shock absorber. (3) A shock absorber contained in gear box.

The Best Type of Transmission Shock Absorber.—

It may as well be confessed, however, that the friction shock absorber leaves much to be desired. The case just quoted illustrates its sensitiveness, and the task of adjusting it is an irksome one. There is a type of shock absorber which is infinitely preferable, in that it need not be adjusted and cannot strike work—namely, the spring-friction device. The Sunbeam illustrated herewith may be taken as a pioneer example, and others, equally good or better, will very shortly make their *début*.

In a transmission shock absorber friction is highly desirable, and the working of the Sunbeam is as follows. The drive is conveyed from one toothed member to the other, so that the tendency is for these two members to ride apart (*i.e.*, for the teeth to disengage) against the pressure of the coil spring immediately the torque becomes excessive. Of course, the working limit of the device is reached ere the teeth actually over-ride each other, so that the amount of independent play afforded is, in this design, rather on the meagre side. The manners in which the principle can be applied are many and varied, and it is to be hoped that its use in one form or another will become more generally adopted. It is particularly applicable to shaft drive, as the sketches herewith show, and cush drives, though excellent, are by no means so effective as the device advocated. CHINOOK

LIGHTING FROM THE MAGNETO.

Generating Electricity for Lighting without Use of Extra Dynamo.

OWING to the shortage of calcium carbide and the difficulty of obtaining it, even by those engaged upon work of national importance, the question of simple electric lighting has become of great interest to the rider. Some information concerning this system, which has been successfully exploited by Messrs. F.R.S. Lamps, 7-9, Pershore Street, Birmingham, may be of value.

In the first place, it is necessary to assure those who go in for this method of illumination that there is no harm done to the magneto. Also, it is important to realise that magnetos vary considerably, and even two magnetos of the same make often give a different amount of power. The degree of spark at the plug points has nothing whatever to do with the current used for the lamps, as this is of the low-tension variety. It is absolutely essential that the magneto employed should have a switch terminal fitted to the contact breaker cover, and if there is not one Messrs. F.R.S. Lamps can make good the defect if the motor cyclist will forward the loose cap which covers the contact breaker. Ordinary lamp bulbs cannot be used, but special 3½ volt bulbs have to be obtained from the makers. It is not necessary to have electric lamps, as adapters can be fitted to ordinary acetylene lamps.

It must be borne in mind that the current is bound to be intermittent at slow speeds, but it becomes practically continuous on such machines as a twin-cylinder Douglas at 15 m.p.h., and on a single-cylinder 3½ h.p. at about 20 m.p.h. It is obvious that, owing to the more even impulses, better light can be obtained from a twin-cylinder than from a single. It must also be remembered that extra engine, or rather magneto, speed does not give extra power, but the discharges being more frequent the filament is not allowed to die down, and therefore a more continuous light is given. The engine power has nothing to do with the amount of light given, but a large magneto will give a better light than a small one.

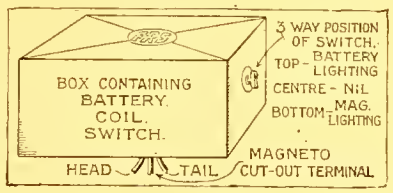


Diagram showing system of wiring.

The accompanying diagram will show the system of wiring, and demonstrates how simple it is to fit up the device to any motor bicycle. The box illustrated is fastened to the top tube, and it is essential to see that the clips make a good electrical connection with the frame, so at these points the enamel should be scraped off, leaving the tube bright and clean.

When starting on the road in the dark the lamps are lighted by the current supplied from the accumulator, which is not switched off until the engine has been started and sufficient speed has been attained to light the lamps from the magneto. The accumulator is used only when the machine is left standing, and, of course, it must be charged, say, once a month at least.

NEW LIGHTWEIGHT RECORD.

A REMARKABLE speed and endurance record has been set up by Elmer Bergstrom, riding a lightweight flat twin Indian, at the Tacoma Speedway, Washington, U.S.A.

Bergstrom was actually in the saddle twenty-one hours forty-two minutes, and averaged nearly fifty-one miles an hour. The total distance covered was 1,106 miles, made up of two periods. In the first half he completed 555 miles, but the distance for the second half of the time was reduced to 551 miles owing to a flat tyre and in some degree to the darkness. The machine carried two electric head lights, supplied with current from a storage battery fixed on the carrier. Three records were broken—the twenty-four hour mileage, the 1,000 mile time, and the 1,100 mile time.

The machine was a stock model in every respect. The engine capacity is 257.4 c.c., so the speed in any case is remarkable. Incidentally, not a single adjustment was made during the ride. Fibre disc wheels were fitted, and despite a stiff breeze no discomfort was experienced when rounding the left-hand banking.

The engine was taken down after the run, and the pistons and rings showed no signs of wear, and the bearings were in good condition. Except for a little carbon on the piston, the engine condition was perfect. The previous twenty-four hour record was 849½ miles.

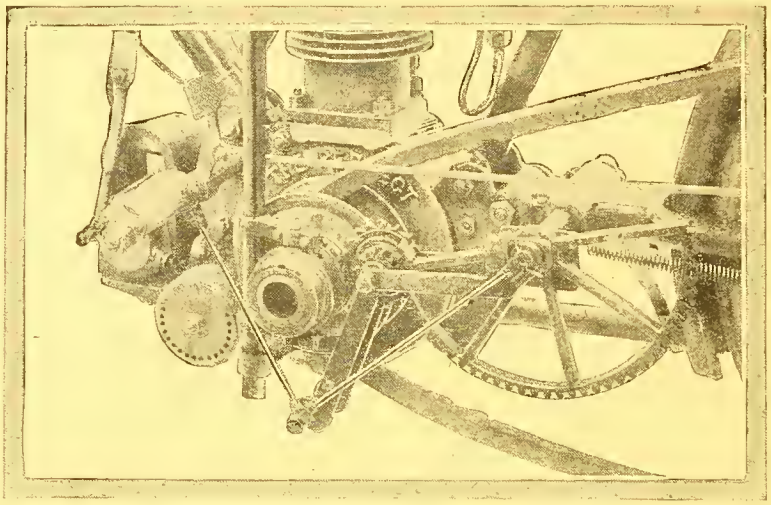
An Ingenious Kick Starter.

A Simple and Practical Idea adaptable to Engine Shaft Gears.

THERE are many hundreds of motor cycles on the road at the present time fitted with controllable expanding pulleys, such as the Zenith, Philipson, and Grado. These are very excellent in their way, but they necessitate the engine being started on low gear, and the machine being pushed off—a method of starting which does not appeal to the physically unfit or to those who have suffered in the war.

A very ingenious device in the shape of a kick starter which can be fitted without much difficulty to machines equipped with this pattern gear has been invented by Mr. H. Hunter, 4a, Clarence Road, Wimbledon, London, S.W.19.

The accompanying photograph gives a very excellent idea of the device. It will be seen that the large quadrant is fitted on a spindle running through the ordinary pedal bracket of the machine. The teeth are tailed off on the right-hand side so that in the event of the quadrant running past the pinion re-engagement is quite easy. The pinion is mounted on a free wheel carried in a special bracket on the exterior of the pulley, and the free-wheel engages with a toothed ring made of Ubas steel on the exterior of the pulley. The quadrant is mounted on a cam, and as soon as the teeth engage the cam pushes the whole contrivance forward, with the result that the free-wheel teeth engage with the toothed ring on the pulley. As soon as the operation of starting is complete the cam brings back the free-wheel clear of the pulley, being enabled to do so by the long spring shown in the photograph. Considering that the device has been made entirely by hand, it is a wonderfully good piece of work, and a thoroughly practicable idea, which we think will certainly appeal to manufacturers of this type of gear. It is also interesting to note that it may be quite well adapted to the N.S.U. two-speed gear.



Showing the starter pedal at the bottom of the stroke, with the free wheel disengaged. During the starting operation the pulley gear is, of course, in the free engine position.

So far as weight is concerned, the starter apparatus weighs less than the usual pedalling gear, and when not in use it is entirely detached from any working parts. It is so geared that one stroke of the pedal gives four revolutions to the engine.

The device fitted to Mr. Hunter's single cylinder sidecar combination works admirably, and though it is not in its final state, but is capable of a little improvement in design, it is in its present form thoroughly up to its work.

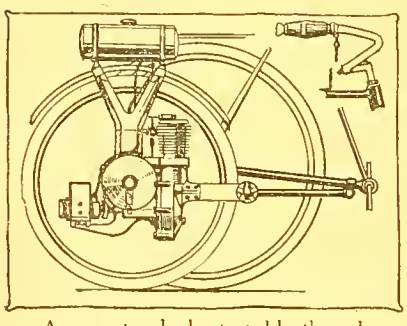
We must point out that it is not on the market at the present time, and that Mr. Hunter is not prepared to supply any of these devices, but he is anxious to get into touch with manufacturers who will be interested in making it in quantities. It should be cheap to make, and there should be a ready demand for it among the many hundreds of users of the type of gear referred to

Some American Patents.

Brief Reviews of Recent American Innovations.

AN auto-wheel and several springing devices are among a recent batch of American inventions connected with motor cycles.

The auto-wheel is the subject of a patent granted to the makers of the Cleveland two-stroke lightweight; incidentally, one of the most successful two-stroke motor cycles in America. The power unit of the auto-wheel is very like that of the lightweight, inasmuch as the shaft and worm transmission is retained. Without doubt the auto-wheel has caught on in the United States.

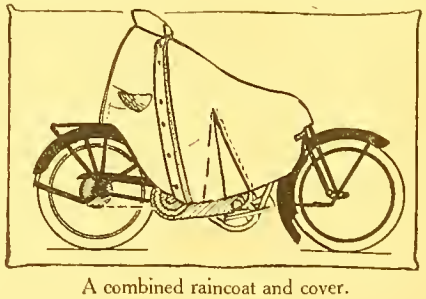


A new auto-wheel patented by the makers of the Cleveland lightweight. Note the power plant with its worm drive.

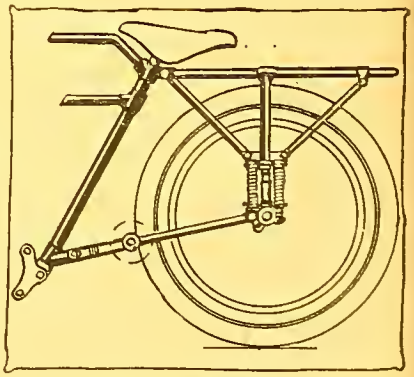
The spring frame design shown here is the invention of Mr. Theophilus Matthews, of Fleur de Lis, and embodies two pairs of coil springs.

To keep off Rain.

Other patents not illustrated here include a pneumatic seat-pillar and pump combined, quick-detachable wheels, brakes, and a spring sidecar suitable for Indian machines; while the comfort of the rider has not been overlooked, since a patent has been granted to a Mr. Cheery (of Racine) for a combined raincoat and cycle cover. Our illustrations are from our American contemporary, *Motor Cycle and Bicycle Illustrated*, to which acknowledgments are made.



A combined raincoat and cover.



A spring frame embodying two pairs of coil springs.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

FOUR-CYLINDER ENGINE DIMENSIONS.

Sir,—Regarding Mr. Harrison's remarks respecting four-cylinder engine dimensions in *The Motor Cycle* for September 26th, it may perhaps interest some of your readers to know that I have a design for an engine of this description, 52 × 82 mm., complete with clutch and gear box, enclosed in one aluminium casting, the overall height of the engine being 18in., and from the front of the engine to the rear of the gear box 24in. only. This should make an ideal power unit for a motor cycle combination.

FREDERICK H. HAMBLING.

PETROL FOR ——?

Sir,—I am whole-heartedly on the side of the discharged soldier in the munitioner-discharged soldier petrol question. But he is not likely to get it. Things do not work like that in England—now.

Authority's attitude is this: We can spare a few gallons from our war stock. How will its disposal for joy-riding best help the war effort of the country? To the munitioner, of course, it will freshen up the output and soothe away his thoughts from contemplated strikes.

So, naturally, it is the man of munitions, not the man who has served, who jogs once more along the road.

No official would dream of worrying his head about the discharged soldier; his effort is over, and he is worthy of no further consideration. Cynical, but true, Mr. Editor!

D. J. SINNOTT.

[*Extra* petrol allowance was not conceded to munition workers for their holidays.—ED.]

ROTARY ENGINES.

Sir,—With regard to your interesting article on my rotary engine, in the issue dated September 12th, I think it should be made known that this invention is fully covered by Letters Patent 116,601. Should any reader wish for further details, he could get a copy of the complete specification from the Patent Office by quoting this number.

I might mention that the difficulties connected with lubrication and maintaining compression, mentioned by you, have from the first had full consideration, and I anticipate little difficulty in these matters, but there is small chance of doing anything practical until the war is over.

I am aware that there have been many inventions on these lines, but my patent incorporates several novel features vital to the successful working of this type of engine.

This type offers such enormous possibilities that I am fully convinced that before many years it will entirely replace all others, and, naturally, it is my hope that my invention will go a long way towards producing this result.

S. L. BURNARD.

THE KEEPING OF MOTOR CYCLES.

Sir,—With reference to your leading article in *The Motor Cycle* of last week, I beg to point out that Regulation 9 AA of the Defence of the Realm Regulations applies only to the areas in which the operation of Section 1 of the Defence of the Realm Regulations (Amendment) Act, 1915, is for the time being suspended. This section is one which gives the right to persons who are not subject to military law to be tried by a civil jury instead of by court-martial, for offences under the Defence of the Realm Regulations.

Under Section 1 (7), in the event of invasion or other special military emergency arising out of the present war, His Majesty may, by Proclamation, suspend the operation of this section, either generally or as respects any area specified in the Proclamation.

At the present time, the only areas affected are certain parts of Ireland, and the amended regulation does not in any way affect the use of motor cycles in Great Britain.

I have written to the editor of *The Times* with reference to the paragraph which appeared recently, and trust that he will insert a further paragraph making the position quite clear, as I find that a number of motor cyclists have become alarmed upon reading that paragraph.

G. D. DEAN,
Legal Department, R.A.C.

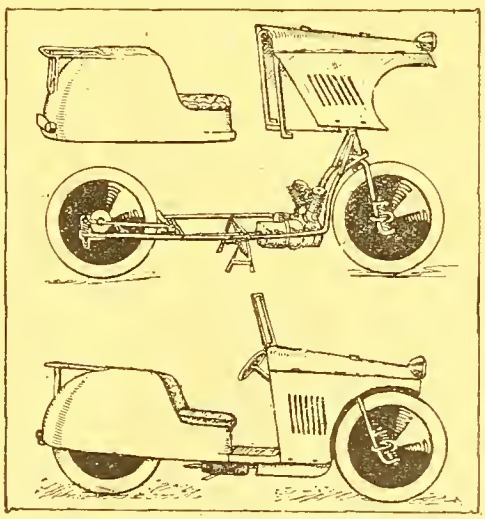
BRITISH MAGNETOS.

Sir,—I had pleasure in reading your correspondent Mr. C. Gaunt's letter *re* generous treatment by E.I.C. Magneto Co., and wish to second his remarks. Some time ago I carelessly broke the primary pin of my magneto, which had a left-hand thread. I wrote to the company for a new pin, and they promptly forwarded one, stating if I sent my magneto they would fit it with a right-hand thread, as on their present magnetos, overhaul, and return within forty-eight hours free of charge. I consider such treatment deserves to be made known and appreciation shown by support.

Castle Douglas. S. INGLE CYLINDER.

THE BICAR.

Sir,—Having seen the article on bicars in your issue of August 1st, I thought that my idea of a bicar might interest you. The accompanying sketch of the machine shows the pressed sheet steel body and guards lifted off. The frame (or chassis) is of light girder steel, and no brazing is used



Bicar design by F. S. Salter.

to build it. The engine is a V twin, with the three-speed gear box and clutch as one unit, as is the case on some light cars. Idler wheels are not necessary, as the footboards are narrow and the feet can easily reach the ground.

A hood could easily be added, and then the rider would be as well protected from the weather as in a small car.

F. S. SALTER.

IN CLOVER.

Sir,—May I point out to "Big Twin," whose letter appeared in *The Motor Cycle* of September 5th, that he is quite mistaken in his deductions regarding the influence of water vapour in determining the explosive force of inflammable gases? What he probably has in the back of his mind is that water is essential for ignition to take place; but he should know that the most infinitesimal trace is alone sufficient for this purpose, and that additional quantities have no influence on the ease of ignition.

If, however, he refers to the influence of water on the course of combustion, on the nature of the end-products of the explosion, and therefore on the energy generated, he is a degree nearer a rational argument, for he has the analogy of the injection of water in a cylinder in which heavy oil is being burnt. If this be the case, it should be noted that the average quantity of water vapour in the atmosphere at night time is much less than during the day, as the air is at a lower temperature, and therefore cannot hold as much water in the form of vapour; the precipitation of dew is not alone a criterion of the water content of the air; temperature is a much more important factor. M.A.

Carlisle.

PETROL FOR DISCHARGED SOLDIERS.

Sir,—I heartily agree with the letter in *The Motor Cycle* by "One of the Old 'Uns" that silver badge men should be granted a small quantity of petrol. Surely they have earned it?

Take my own case for example. I am lame, and am unable to walk any distance. I laid my case before the Petrol Control Committee early this year. After writing six letters requesting a reply, they informed me that they were unable to permit petrol to be used for health or pleasure purposes.

Half a gallon a week would be an untold blessing to me. Of the thousands of discharged men only a small percentage are motorists. Surely after what we have done for the country this small concession can be granted us.

The difficulty is to find an organisation that will stick up for us and lay our claim before the Petrol Control Committee in the proper manner. EX 29TH DIVISION.

Littlehampton.

THE THREE-JET BINKS CARBURETTER.

Sir,—Referring to "W.S.B.'s" letter, I would refer your correspondent to my long letter in your issue for September 12th, in which I state that, if a dead spot occurs in the carburetter it is caused by a defect in the carburetter or the fitting of a wrong sized jet. I emphatically deny the dead spot is the result of the *design* of the carburetter. Your correspondent states that he has never had a carburetter which showed the dead spot due to weak mixture. This shows that he has never had a carburetter which has had a defect which would cause the dead spot. I wonder if Mr. Robbins, who won the "Manufacturers' Trophy" in such a marvellous way, would have employed a carburetter with such a defect in it. A considerable number of my customers, when they get a carburetter, simply throw the instructions away with the packing, thinking they know all about it. Your correspondent has something to learn when he says that the air slide has little bearing on the running, and that its presence is more or less immaterial. I say that the adjustment of this air slide is of considerable importance, as it corrects the mixture, or dead spot, which would otherwise be caused by over richness, when the throttle is just uncovering the main jet.

I have seen many riders who use my carburetter, and who have told me how delighted they were with it, who have not got it running in what I call the best form, owing to their not having attended to the instructions, and who have thus deprived themselves of some of the pleasures to be got out of this instrument.

If your correspondent will do me the honour of calling upon me I shall be glad personally to explain the carburetter to him, and take him out on one of several machines which I have here, and which will give an absolutely gradual increase of speed, from dead slow to all out, by simply moving the throttle lever. I say that when the carburetter is correctly adjusted, there not only should be no dead spot, but not the slightest suspicion of one. "W.S.B." says that if he fits a smaller main jet there is no dead spot but a blow back when going all out. This shows that he has opened the throttle too wide, and so thinned the mixture too much. One of the special features of the Binks automatic carburetter is that the throttle should be opened in accordance with the speed of the engine, or, in other words, the engine must not be offered more air than it can take, as any motor cycle engine with any carburetter would give blow back if the air lever was opened wider than it should be.

C. BINKS.

BRITISH AND AMERICAN MACHINES.

Sir,—I was interested in Mr. F. R. Hall's addition to the British *v.* American controversy, and see that, after making known his Overseas experience, he uses this to try and quash "Chinook's" "journalistic exaggeration" (?) There are no conditions at home more approaching those of Overseas than the ones existing in the South and West of Ireland, and having experience of both British and American machines under these conditions, I agree with your correspondent that we must have spring frames. In making this statement, I am not considering comfort alone, as this is only a small part of the advantages to be gained; but it is not we riders that demand the spring frames but the very machines themselves. They are required so that we may keep our accessories and fitments on the machines; to keep our spanners more permanently in our tool-kits; to relieve our frames of the awful strains imposed; and to eliminate the rattle and shedding of parts from which we suffer.

Now, to refer to the one sample of American spring frame, we have, I grant you, the extra comfort, but the most rigid framed 24in. wheeled British machine would shed fewer parts under our conditions than the culprit in question. If Mr. Hall has "during his campaigning" any leisure let him take a rule and measure the respective distances between the front tyre and the forks on each side of these American machines, and he will find that where any sidecar work has been done, the front wheel is practically rubbing on one side.

The British machines for the Russian military authorities, as regards workmanship and material, might well be put in glass cases in American factories as an example of the thorough engineering job we expect and get over here. But do not tax them in detail design, as most of these designs were stipulated for by the Russian military authorities.

The old cry of "American flimsiness" *does* still hold. Take, for example, the sheet-metal silencers and tail pipes; the footplates, which are usually loose and sloping outwards, and which do not accommodate British feet; accumulator cases; foot-brake pedal gadgets; control twiddly bits, etc.; and just fancy asking your best girl on a wet night to put a big brick under the crank case while you endeavour to raise the punctured front wheel. Now the person who has examined the mudguarding, finish, detail work, and design, and who has knowledge of the engine and transmission efficiency of a modern big Britisher, says that there is no finer finish (whether he means inside or outside) than that of some of the American machines.

It is not fair for Mr. Hall to take out the two American masterpieces of the type in which they specialise, but, notwithstanding the experience that the Americans have had in marine two-stroke engines, what legs would one have to stand on who would compare some of their freak lightweights with such machines as the Velocette or Allon? Why, some of the cheaper American lightweights, with their loop-the-loop frames and rhinoceros appearance, are more like things we are accustomed to seeing only in cheese. Which would Mr. Hall prefer to remove, an American back wheel to change a tyre on a bad night or to fit a British interchangeable wheel? Would he also tell us from his "knowledge gained from trade experience on the spot" if Overseas riders are judges of mechanical skill, of thorough honest workmanship, and if, after a fall, are they particular whether their back wheel follows the front one or not? If Mr. Hall really has that experience of American machines that empowers him to criticise "Chinook" so definitely, has he found whether American twins run better on the ball bearings of the wheels or on the chewed up ball races?

I, like Mr. Hall, am quite unbiassed. A machine's name or nationality would not influence me at all if it appealed to me otherwise, provided it was not a Hun. Therefore, provided that the pre-war British superiority is maintained after the war (and I feel sure that it will be doubled), I will leave American machines out of the question for service on the abominable Irish roads. GERALD COATH.

TANGENTS OF OBSERVATION.

Sir,—A correspondent, Mr. J. Holland, in your issue of September 19th, asks for a formula which will supplement an article, "Tangent Observation," referred to, but which I have not read.

A close approximation for the range to the visible horizon of an aerial observer at given heights is given by the formula

$$D = \sqrt{\frac{3h}{2}}$$

Where D = Range to visible horizon in miles.
h = Height of aerial observer in feet.

This formula is sufficient for practical purposes, as the determination of heights by the most approved appliances yield only approximate results.

Two modifications of this are possible :

(1.) At sea. The masts and funnels of a ship coming into range while the waterline is still below the horizon are visible at a range greater than that calculated for the given height.

(2.) Overland. The nature of the surrounding country will greatly modify this, and in place of the height above sea level we must substitute the difference in height in feet in the formula.

From the above formula we find that an observer at 1,000 feet has an approximate range of thirty-nine miles, which is (1) under certain circumstances greatly increased, and an area of approximately 5,000 square miles (not including that of case 1) under observation.

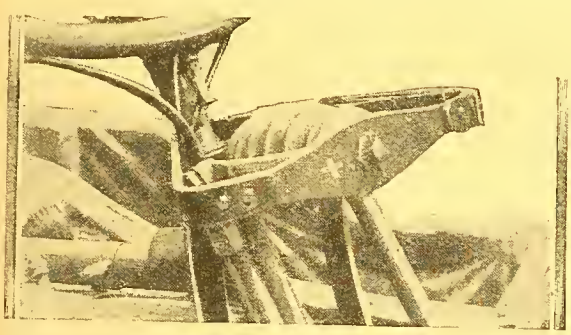
At 10,000 feet we find that the approximate range has increased to 120 miles to the visible horizon.

I should be glad of observations as to the effect of refraction on the light rays in passing from the layers of heavier density to the layer of lighter density. Is the height sufficient to make an appreciable difference?

London. CPL., R.G.A.

SUPPLEMENTARY SPRING.

Sir,—I enclose a photograph of a protected device for use with a Triumph spring fork to avoid breakages over bad roads. Part marked X is a leaf spring which fits over hexagon nut or is screwed on in its place. This spring is



See letter C. Roe.

secured to the steering column by a leather strap with buckle. Briefly, the idea is to check undue extension of the coil spring, which results in breakages, while not impairing the normal resilience of the spring in its compression and extension.

The device is simple and inexpensive, and quite effective, and can be attached in a minute or so without any alteration to the fork.

C. ROE.

ONE-LEVER CARBURETTERS.

Sir,—I have read with pleasure and interest the letter and description of the one-lever carburetter designed by C. R. Eastwood.

I take this opportunity of thanking your readers who have forwarded designs, and I am sorry that at present I have not the time to go fully into the merits of each, but can assure them they will be carefully considered at a later date, and the matter treated with the utmost confidence.

It is very gratifying to see such a large number of motor cyclists interested in the perfection of carburation, especially those who are away at the Front fighting our battles.

I am sorry to say that the Censor has returned several of my letters sent to men at the Front, on account of the printed matter I enclosed, which I thought would interest and cheer them. I do not profess to be an expert on carburation; but I beg to suggest to Mr. Eastwood that whilst figs. 1, 3, and 4, viz., starting, full power at slow speeds, and engine cooling appear to be correct, No. 2, normal position, is correct only under certain conditions. After the engine is warmed up there should be gradual increase of air, whereas in the design submitted after a certain point is reached the extra air is gradually decreased until it is cut off entirely at full throttle for slow speeds. There is a time when full throttle with extra air is necessary, and this should increase gradually from about a quarter to full throttle when running at full speed on the flat.

I cannot help any designers at present, on account of the difficulties in manufacturing; but I am prepared to pay for, and experiment with, a one-lever carburetter on my new two-stroke engine, if it can be supplied.

I notice in *The Motor Cycle* for September 26th an interesting account of a friction drive for a motor cycle, and at a later date I shall be pleased to give your readers an account of a friction drive I have designed and tested.

Up to now it is a failure. Weight, or rather appearance of weight, with long wheelbase are the disadvantages in this design, but to my mind the great drawback is the fact that a friction drive necessitates the engine being turned round the opposite way in the frame.

I should like to hear if any of your readers has fitted a one-cylinder engine, without duplex frame, with the engine turned round the opposite way.

The torque of a four-cylinder engine and special duplex frame similar to the Henderson may minimise the vibration, but up to now I am confident it is the wrong way to place a single cylinder engine in the frame.

EDWARD TILSTON.

CYCLE CARS.

Sir,—I should like to impose on your time and space once more in answer to the letter of "Two Tracks" in your issue of September 19th.

I was not surprised to see a letter of criticism on my letter, and I admit that it looks rather tall at first sight, but I hardly imagined it would be capable of disturbing the peace of mind of our friend in such a manner as his letter suggests.

First of all, it may be as well to state that I made an error in quoting electric starting, when I really meant electric lighting. I was quite unaware of the mistake until I saw the letter in print.

Electric starting is not essential, of course, but electric lighting (as a standard feature) should, I think, be included.

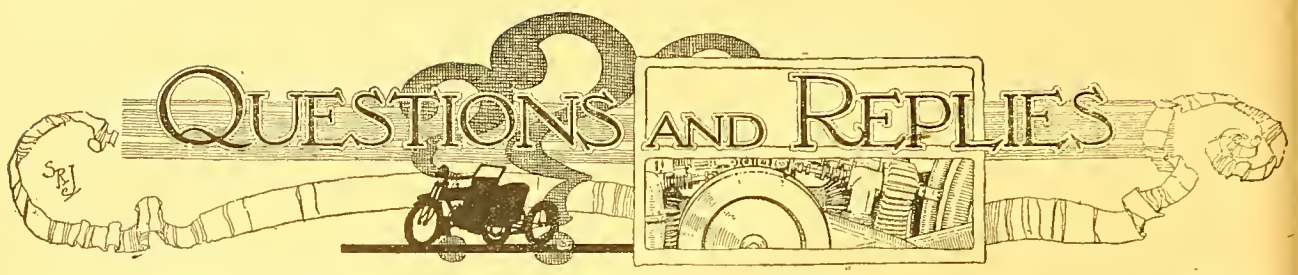
Re the three speeds and reverse, well, I really do not see any cause for undue excitement about that. We already have two speeds on the car I mentioned, so that the addition of another speed and reverse should not make such a great difference in price.

Of course, I am quite aware that all these little items help to swell the price, and if they are only turned out in small quantities then the success of the venture is to be doubted; but I still believe that if any firm threw the whole of their energy into such an enterprise (even though the first year's profits were small) the ultimate sale of their cars would be so great as easily to counterbalance and outweigh any extra cost of plant, etc., which might have been incurred.

I may be wrong, and I may be right; but, of course, correctness of opinion would only be proved by actual experiment. If, a few years ago, Henry Ford had told the world that he could produce so efficient a vehicle as his light van at about £87 people would have laughed at him, especially "Two Tracks," and the remainder of the Stone Age type, but—he did it. And how did he do it? Simply by quantity production, which is built up of *standardisation* and *great concentration* on one point. He belongs to the class which can see ahead without the telescope of time.

"Two Tracks" seems to be labouring under the illusion that I expect such a car under "the times in which we live," whereas a little thought would tell him that I referred to the post-war production, when the release of men (the right ones at that) and material will greatly assist the efforts of the manufacturers. His reference to the millennium is somewhat amusing when one makes a study of his ideas. He also thinks that thousands will follow his example. Probably. But thousands will not.

SERGEANT-MECHANIC, R.A.F.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply**. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Breaking Piston Rings.

I have a 1914½ Triumph motor bicycle, and every time I take the engine down I find the top piston ring broken at the steps. The bottom ring is the one I bought in the machine, and it is still in good order. My agent cannot explain the cause. Will you please give me the necessary information?—W.F.

The trouble is a little difficult to explain. It is probably due to a reduced amount of lubricating oil. Increase your supply a little, and we think that you will have no further difficulty, provided, of course, that the rings are a good fit.

Pillion Riding.

(1.) What, in your opinion, is the most suitable motor cycle for carrying a passenger on the carrier, and for reliability and economy for week-end tours of about one hundred miles? (2.) Are the frame, engine, and carrier of a 2¾ h.p. Douglas strong enough for carrying a passenger? (3.) What is the approximate petrol consumption of a 2¾ h.p. Douglas and a 4¼ h.p. B.S.A.?—G.O.O.

(1.) As carrying a passenger on the carrier is a practice at no time to be recommended, we do not think we can tell you any machine which is specially suited to it. (2.) Yes. (3.) About ninety and eighty miles per gallon respectively.

Trade Queries.

(1.) Which is No. 1 cylinder of a Douglas? Also all other horizontally-opposed twins? (2.) Which is the best method of testing magneto windings for defects? Can it be done with a battery? If so, which kind of battery is best? (3.) What would you suggest I should do? I have a magneto that I believe shorts somewhere. It gives a lovely spark when off the machine, but will not fire at all when timed up to the engine. (4.) What thickness of insulating coil wire would you suggest my using to wind on the magneto magnets for remagnetising them? Off a dynamo and charging apparatus giving off 110 volts and 10 amps. I have done remagnetising with this several times with good results by using ordinary bell wire, but I think it is too thick when only 10 amps. is available. (5.) How can I copper cast iron for brazing?—H.E.H.

(1.) The No. 1 cylinder of an ordinary flat twin motor cycle is the rear, but as regards magneto timing it does not matter which is regarded as No. 1 on this type of engine. (2 and 4.) These are both trade matters, and as you are evidently an amateur we should not advise you personally to attempt either of the experiments you suggest, but to send the magneto to a competent repairer. (3.) Your trouble is most probably due to looseness in the armature bearings, with the result that when the driving chain is fitted to the magneto the armature is forced into contact with the pole pieces of the magnet; this is a matter that has frequently been mentioned in *The Motor Cycle*. We assume you have made sure that the trouble is not due to any such difficulty as the contact breaker switch terminal being brought into contact with any part of the machine when the magneto is in position. (5.) We have never heard of coppering cast iron for brazing. Malleable iron may be brazed without much difficulty, ordinary cast iron not at all. If you mean soldering, there is a patent process for soldering cast iron, but as this is outside our province and is purely a manufacturing process, we regret we cannot give you any details. You might try for such information as this some such paper as *Work*.

Altering a Magneto.

I have a 1915 electrically equipped Harley-Davidson, which I should like to convert into an ordinary magneto model. As I cannot buy a magneto without a permit (which I have been refused), I wish to know if it is possible to alter a Bosch anti-clockwise magneto to suit the Harley-Davidson, which takes a clockwise magneto, and what alterations it would be necessary to make?—C.H.

It is quite possible to convert a magneto from anti-clockwise to clockwise direction of rotation, or *vice versa*, but this can only be done by fitting a new contact breaker. Also, if the angle of your magneto (which should be stamped on the contact breaker ring) is not the same as that of your engine, you, of course, will have to remedy this defect by moving the operating cams. To do this only one cam must be moved, and you should move it the requisite number of degrees following the direction of the rotation of the magneto. It is most important to remember that the magneto revolves at half engine speed; thus, assuming your present magneto is 45° and you want to make it into a 50°, you should move one cam 2½° further along the internal periphery of the contact breaker ring in the direction of armature rotation.

Loss of Compression.

Some days ago I was riding a 3½ h.p. 1911 Triumph at about 22 m.p.h., and on approaching a sharp corner I put the machine in free engine and put on the back brake. Almost immediately the engine ceased firing, and I have found it impossible since to get it restarted. On running with the machine I notice that a slight explosion may be heard, just such as one may hear when the exhaust is open, when starting the machine with a run. I have tried valves and springs, piston rings, compression tap, etc., and have found all in order. The machine may be wheeled along with the exhaust closed and clutch engaged, although, of course, if everything were right this would be impossible. Can you tell me the source of the trouble and how it may be remedied? The ignition is quite perfect and the petrol pipe free.—I.H.

The only thing to do is to take the engine down and thoroughly investigate matters. From what you say, you appear to have lost all compression. This may be due to a broken valve, a hole in the piston, or various other causes, which you may properly trace after careful investigation. Are the valves working properly when the engine is revolved? It may be that some of the timing gear pinions have slipped, or even the pulley may have sheared the key and be turning on its shaft.

RECOMMENDED ROUTES.

WALSALL TO GRIMSBY.—J.M.

Walsall, Lichfield, Burton-on-Trent, Derby, Stapleford, Nottingham, Newark, Lincoln, Wragby, Louth, Grimsby. Approximately 130 miles.

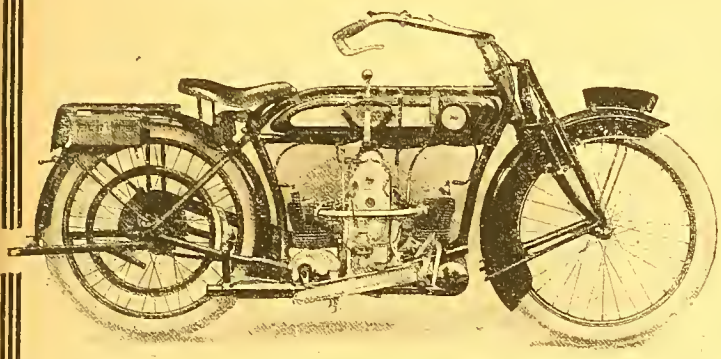
DONCASTER TO SHREWSBURY.—S.D.

Doncaster, Worksop, Mansfield, Sutton-in-Ashfield, Alfreton, Wirksworth, Ashbourne, Rocester, Uttoxeter, Weston, Stafford, Newport, Crudgington, Shrewsbury. This route avoids all big towns except Stafford. Approximately 115 miles.

DERBY TO BLACKPOOL.—W.H.

Derby, Belper, Matlock, Bakewell, Buxton, Macclesfield, Chelford, Knutsford, Mere, Warrington, Prescot, Rainford, Ormskirk, Rufford, Preston, Kirkham, Blackpool. The *detour* from Warrington avoids most of this town and also Wigan, neither of which is very pleasant to traverse, owing to the heavy traffic and bad roads.

Humber



3½ H.P. TWIN HUMBER.

Official.

D.O.R.A. now prohibits "the having, keeping, or using of a motor cycle by any person other than a member of his Majesty's Forces or a police constable, without a permit from the competent naval or military authority, or from the chief officer of the police in the district in which the person resides."

PRESENT OWNERS:
Keep your Humber for the return of better days.

FUTURE OWNERS:
Have your name entered on our Waiting List to secure the earliest possible delivery of a post-war model.

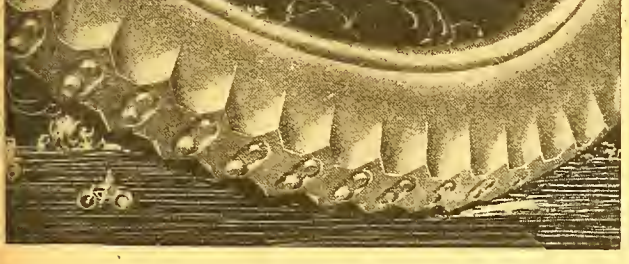
HUMBER LIMITED,
COVENTRY.

BELDAM
ALL BRITISH TYRES

OF the several types of Beldam Tyre there is none which is more efficient than Beldam V Steel Studded Tyre, in which the rubber tread and the steel studs are both on the same level—the grip for *every* kind of road surface is there. No other tyre will wear longer or give you better value for your money. Our Booklet "Testimony" (post free on request) will tell you what the users of Beldam Tyres think of them

Write for Price List, also for particulars of Beldam "V" All Rubber Tyres and Beldam Retreads.

The Beldam Tyre Co., Ltd., Brentford, M'sex.



All war-workers should use

WAKEFIELD Castrol MOTOR OIL "C"

(Summer Grade)

for efficient lubrication of Motor Cycles.

Immediate delivery to rail guaranteed.

C. C. Wakefield & Co., Ltd.
(Sir Chas. Wakefield, Bart., Governing Director).
WAKEFIELD HOUSE
CHEAPSIDE
LONDON.
E.C 2.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

3½h.p. Abingdon King Dick, N.S.U. 2-speed, mag., in excellent running order; £18, or near offer.—Goldsmith, Amberley, Sussex. [X8545

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

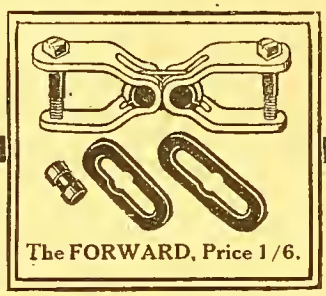
1914 A.J.S. Combination, guaranteed perfect order, all lamps, etc.; lowest £60.—Morpuss, Sedgley, Staffs. [X8452

A.J.S., 1915, 4h.p., in excellent order, full accessories, £57; with sidecar £66; exchange.—St. Lucia, Sandhurst, Berks. [8480

1917 A.J.S. Combination, 6h.p., Lucas dynamo lighting, hood, screen, very fine outfit; £135.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

A.J.S. 1918 6h.p. Combination, spare wheel, wind screen, luggage grid, speedometer, lamps, horn, spares; £65; seen 1.30 to 4.30 p.m.—Doctor, 6, St John's Rd., East Ham. [8712

5-6h.p. Twin A.J. Stevens, Chater frame, engine rebushed, new connecting rods, rings, and thoroughly overhauled, new Amac carburetter, 1in. Dunlop belt, adjustable pulley, inner tubes, and toolbag, back tyre strong retread, all in thorough going order; price £35.—Steel Hardware and Engineering Co., Albert St., Oldbury. [X8371



The FORWARD, Price 1/6.

FIT YOUR BELT WITH THESE

Forward fasteners never fail—never fail to give sound service, never fail to please. They are reliable under all conditions, providing that added sense of security which means more pleasure from your ride. Take no risks with any less reliable make, but fit just every time

the Fastener that Never Fails—the

FORWARD.

FORWARD MOTOR CO.,
Forward Works, Summer Row, Birmingham.

177

NERVES?

Have you weak nerves, stomach or digestive trouble, heart weakness? If so, I believe you can regain normal health by my aid. Note particularly I undertake your case only when satisfied **I can cure you under my guarantee.** Send to day to-morrow never comes, for my remarkable free book, or, better still, write me, telling all you know about your ailment. Then I will advise you conscientiously—my 20 years' practical experience is freely at your disposal. You will be **under no obligation** whatever.

"JOHN BULL said: "Readers are recommended to write to Mr. Thomas Inch."

Because it is a national duty to be efficient WRITE NOW (enclosing 3d. in stamps) for BOOK and ADVICE.

THOMAS INCH, *Health Consultant,*
(Dept. M.G.) 74, Clarendon Road, Putney, LONDON, S.W.15.

MAGNETO REPAIRS
and spare parts

We are well qualified to undertake the repair of Magnetos of all makes, and to supply spare parts, being, as we are, one of the most experienced firms manufacturing Magnetos.

SIMMS MOTOR UNITS, LTD.,
Percy Buildings, Gresse Street, London, W.1.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S., 2¾h.p., 3-speed countershaft, excellent condition, speedometer, lamp, etc., £42; 2-speed £35; 6h.p. combination, 60 gns.; E.P. or exchange Service Co., 292, High Holborn, London. [

A.J.S. Spares; prompt delivery.—Cyril Willis Chapel Ash Depot, Wolverhampton. [

Alldays.

ALLON, 2¾h.p., 2-stroke, 2-speed, 1914-15 model perfect; 25 gns.—232, Brixton Rd., S.W.2. [

ALLDAYS Alloa, new single speed, £38; ditto speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed as new, £39/10; ditto, with lamps, horn, etc., extended payments or exchange.—Service Co., 292, Holborn, London. [

Ariel.

CROW Bros., Guildford, Ariel agents.—New and hauled second-hand models in stock. [

1917 3½h.p. Ariel Combination, No. 8,657, age under 500, new appearance, mechanically fect, with lamps, tools, sidecar apron, complete; inspection or trial, York district; best cash offer.—2,315, c/o *The Motor Cycle.* [X

Bat.

BAT-J.A.P. Combination, 1914, 6h.p. twin, com shaft 2-speed, kick starter, clutch, round t Bosch mag., T.T. handle-bars, coachbuilt sidecar, h wind screen, lamps and horn, enamelled grey thro out, good condition; £42.—The Premier Motor Aston Rd., Birmingham. [

Bradbury.

BRADBURY Combination, 4h.p., exhibition tur 1916 show, 4,700 miles, very best accessories, fect; £45.—Vowles, Lowbourne, Melksham, Wilts. [

B.S.A.

1916 B.S.A. 4h.p. Coachbuilt Combination, com shaft gear, accessories; £87/10.—Palmer's Gar Tooting. [

B.S.A., 3½h.p., clutch, watertight mag., low re position, in tip-top condition; £36.—Apply, Pe 136, Evering Rd., N.16. [

B.S.A., 1915, 3-speed, chain drive, coach side hood and screen, new tyres all round; £50; sider exchange big twin.—Deane, Matlock Bath, De shire. [X

B.S.A., June, 1917, used 2 months only, no lic this year, chain-belt, Lucas lamps, Lucas h perfect; £70; seen Cambridge.—Motor, 68, Oxford race, Hyde Park, W.2. [

1916 B.S.A. Model K. Combination, large canc sidecar, P. and H. head lamp, rear lamp, ap and all accessories; this machine has only been use little; £63.—Walbro' Cycle Co., Saffron Walden. [X

1914 4½h.p. B.S.A. and luxurious Swan side coach-built, screen, tyres as new, spare ch complete kit of tools, speedometer, horn, lamps spare tubes, just been overhauled.—Annandale, Bakery, Aston Clinton, Tring. [X

Calthorpe.

1916 Calthorpe, 2-stroke, lamps and horn, splen condition; £30.—Parker and Son, St. Ives, Hu [

CALTHORPE Motor Cycles.—All models in stock immediate delivery; no permits required.—P. Evans, 91, John Bright St., Birmingham. [

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Motor Cycle and Automobile Engineers.

SINCE the very inception of the motor cycle movement there has been a tendency rather towards the amalgamation of motor cycle and pedal cycle interests. This we have watched with keen disappointment, knowing how widely apart the two movements are divided. It is true that many motor cycle manufacturers also make pedal cycles (so also do makers of cars), but between the users of the one type of cycle and the other a great gulf is fixed. Not an insuperable one, it is true, because a good many cyclists become motor cyclists, indeed all riders of solo machines have probably learnt the art of balance on a pedal cycle, but the sympathies of the two are totally different, and the average cyclist is often an anti-motorist.

Take, as an example, the shows. Nothing is more irritating to the enthusiastic motor cyclist than to have to wander through avenues of pedal cycles to find the machines in which he is particularly interested. This was especially marked in the early days, but, though it is better now, there is still too much mixing of the different types of vehicles at Olympia. If motor cyclists alone had the organisation of the show, we feel quite certain that they would classify all the motor cycles together and put all the pedal cycles, which possess no interesting features to the motor cyclist and never change from one year to another, in a separate part of the building.

But it appears that a change is taking place, and we note with pleasure that the Institution of Automobile Engineers—a body which has done an enormous amount of good in fostering the design of motor cars—is now inviting motor cycle engineers to become members. This cannot have otherwise than a most beneficial effect upon the industry in general. The motor cycle engineer has a great deal to learn from the motor car. In the design of a motor car there has been, up to the present, a much wider scope for the clever designer, whereas up till 1914 motor cycle engineers were falling too much into a groove, were showing little originality, and were tending to become slavish copyists.

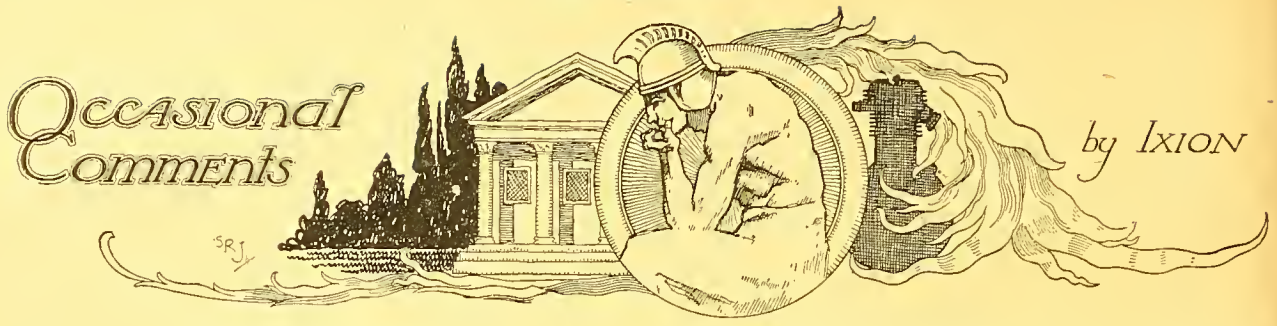
For motor cycle engineers to have the opportunity of discussing technical details with their brothers of the automobile world cannot but have the effect of improving the design of the motor cycle, and we learn of this development with the greatest satisfaction.

In an announcement forwarded to us by the Institution of Automobile Engineers, the subject is referred to in the following terms:

> "A very useful development of the work of the Institution was initiated in the election of a very considerable number of engineers who have identified themselves with the motor cycle branch of the industry, and who have hitherto not to any considerable extent interested themselves in the work which the Institution has been doing. The elections already made will undoubtedly lead to many more members of this branch joining, and steps are being taken to hold at least four meetings in Birmingham in addition to the London meetings, when the many points connected with the design of motor cycles and their components which need discussion will be brought forward.
>
> "Particulars of the meetings to be held will be announced at an early date, and it is hoped that, now that the Institution is paying special attention to this particular branch of the industry, motor cycle engineers will communicate with the secretary with a view to election. Attention is particularly given to the fact that the qualifications required for membership have been in no way relaxed with a view to admitting motor cycle engineers; applicants must make it quite clear to the Council that they are just as good 'engineers' as those who have hitherto been admitted."

We shall look forward with the greatest interest to the outcome of this development.

An index to the advertisements in this issue will be found on the page facing the back cover.



British v. Yankee.

I HAVE already intervened more than once in this interminable discussion, and—on the whole—stated reasons for preferring the Britishers. Justice, however, compels me to cede one point to the Yankees. I was standing outside a London terminus the other day, engaged in the usual heart-breaking hunt for a taxi. Within three minutes a couple of side-car outfits burbled past. The first was a typical British single-cylinder of good make, driven by a soldier, and obviously in perfect tune. Not a solitary sound did it emit except for the intolerable yapping bark of its crisp exhaust—a note as pleasant to an engineer as it was emphatically objectionable to everybody else. The second was a big Yankee twin, accompanied by the usual subcurrent of multitudinous minor noises. In tune it did not compare with the Britisher, though it was more recent in date; in fact, it is questionable whether its design permitted anybody to keep it in perfect tune, except at the cost of eternal replacements; for it incorporated many items which were bound to wear, and some which were barely noise-proof before wear had begun. On the other hand, its subdued smother of petty sounds was far more pleasant to an untrained ear than the appalling bark of the Britisher: only an engineer could award the palm where the palm was due. Ninety-nine girls out of every hundred, plus every douce middle-aged tradesman, dreaming of week-end jaunts, would vote for the Yankee mount every time. The Yankee maker may not be as sound an engineer as most of my Coventry friends: but he understands that the buying public do not want machines which sound like a trench mortar in action.

Durability Overdone.

HERE is another yarn with a similar moral. I was dawdling about a village smithy whilst a colleague helped the burly blacksmith to repair the brake rod of his light car. I began to kill time by studying some agricultural implements awaiting repair in the back yard; and my Coventry-nurtured soul was shocked to find how many parts of Yankee binders, designed to take quite tolerable strains, were made from castings, and appeared to snap like carrots at frequent intervals. I upbraided a loitering farmer for not buying solid British stuff. He waxed quite warm on the subject. British stuff cost a lot more—he did not mind that. It wore a great deal better—he did not give a snap of the fingers for that. Improved designs were always coming out—British stuff was hopelessly out of date long before it was worn out. But if he bought Yankee stuff, its cheapness permitted one to scrap it and keep up to date. In other words, expenses were about the same, whichever you bought: but if you were patriotic, you were always out of date, and if you bought shoddier imported stuff, you were always up to date. I suggested the annoyances of emergency repairs bang in the middle of the ploughing or harvest. He laughed at me—"You can always get spares at X (the local agency) in peace-time: it's only since the war that we have had any trouble about that!"

The Moral.

I QUESTION whether many motor cyclists ever figured out the comparative running costs of a first-class British motor cycle and of a 1914 American (I quote that date because I have every reason to think that Yankee quality is at last nearing our own standards). But, viewing the motor cycle industry from its commercial side, rather than from the standpoint of a conscientious engineer, it is possible to make motor cycles too good. After all, the vast majority of pre-war buyers bought a new machine every year, and cared very little what sort of service the bicycle would give in its third year. I am not pleading for a reduction in quality. I am merely pointing out that there is no sense in selling people a better article than they want. The milliners and dress-makers are aware that their more fashionable customers buy for a single season's wear only, and so they don't design creations to last for a decade.

The "One Season" Mount.

AGAIN, it is probably true that we have almost seen the last of that England in which there were thousands of self-indulgent youths, able to pay £75 or more for a motor cycle at Easter, and to dispose of it for £40 twelve months later. We are all to be a very great deal poorer for the rest of our lives, and the motor cycle will be a utilitarian purchase by comparison with the good old days. The American makers understand this—that is why they are stiffening up their quality. It would be a real calamity if our own trade tardily grasped the part that shoddy quality once played in the sales of imported models, and applied the lesson to a totally different set of circumstances. After the war pride of place will go to the machine that has four years of real hard service in it, and that on a basis of minimum cost for replacements and professional overhauls. On such a basis some of the best Britishers could make most of the best Americans look extremely foolish. The American firms know this, and this ancient contrast will not hold good after the war. We might state the post-war desiderata somewhat as follows: (1.) Low cost. (2.) Durability (including reliability). (3.) Comfort. (4.) Suitability for maintenance by an amateur. (5.) Speed and hill-climbing. (6.) Low weight.

AIR-COOLING BY FORCED DRAUGHT.

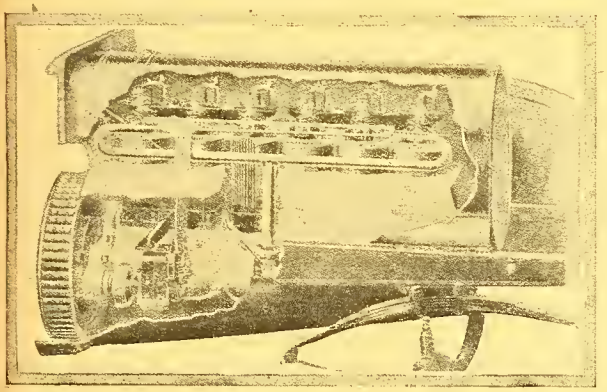
Some Interesting Notes on Unconventional Air-cooling.

IT is common knowledge that the average air-cooled engine is more economical in petrol than the water-cooled type. Without going into the technics of this, the reason undoubtedly lies in the fact that with a water-cooled engine the temperature of the cylinder walls never much exceeds 212° F. (boiling point), and that higher temperatures than these, which are general with air-cooled engines, produce greater thermal efficiency. Especially is this the case with the heavier fuels now in use, and for this reason alone there seems no doubt that the popularity of the air-cooled engine as a propellant for motor cycles will not diminish.

Before the advent of the present-day aeroplane the air-cooled engine had fallen into disfavour with designers of all machines except the motor cycle, and in the latter direction several designers were turning their attention to water-cooling. The rapid development of the air-cooled aeroplane engine, however, has imparted new impetus to the air-cooled type; but even in an aeroplane, when the propellers are of the pusher type, it has been found necessary to fit cowls and an air fan to draw a current of air past the cylinders. If this is necessary in the case of machines travelling at a speed of 60 m.p.h. and more, one may understand that such a system would benefit motor cycle engines.

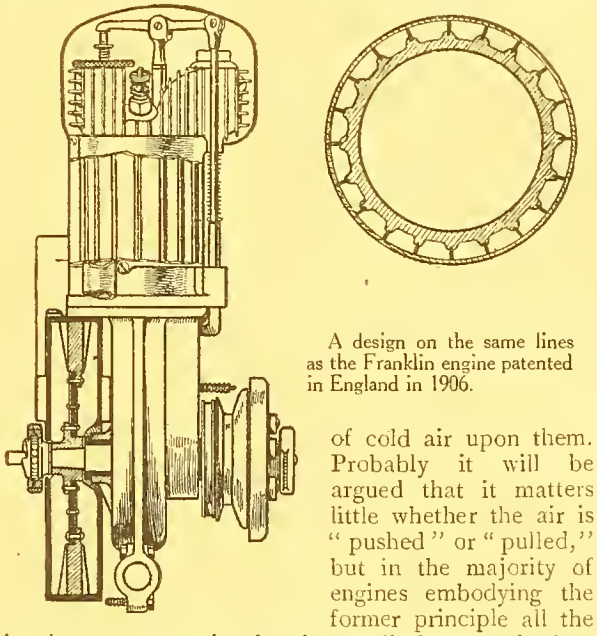
Induced v. Forced Draught.

It may interest readers of *The Motor Cycle* to know the results of certain experiments carried out by myself to overcome overheating troubles on a cycle car fitted with a motor cycle engine. This machine had a twin engine under a bonnet with an imitation radiator in front—an improvement over the "bird-cage" netting with which it came to me. I fitted fans, and ran with all open front, but the engine continued to overheat on ordinary hills. After several other experiments, such as lowering gear and compression ratios, finally I fitted a "floor" which boxed in the upper part of the engine. At the rear I left a gap, through which the hot air was drawn when the vehicle was in motion. This cured the trouble, and I was able to raise the compression again and refit the imitation radiator.



The Franklin car engine.

This suggests that it is more important to draw off hot air around the cylinders than to impinge a blast of cold air upon them. Probably it will be argued that it matters little whether the air is "pushed" or "pulled," but in the majority of engines embodying the former principle all the air does not reach the hot cylinders, and does little more than disturb the air, while, if all the hot air can be removed, cold air must take its place. Roughly, this is the principle adopted in the Franklin American air-cooled engine. It may not be known generally that this car—with a six-cylinder engine of 42 h.p.—is regarded as the only successful air-cooled car on the market that is well known. It is not a new proposition, but has been sold in large quantities in America for many years, and consumption tests carried out by private owners under official observation have proved that very low petrol consumption is obtained. In 1915, out of 137 Franklin cars which competed, fifteen of them accomplished more than 40 m.p.g., four of them went over 50 m.p.g., and one—the winner—fifty-five miles on a gallon of petrol. Forty-four of the highest records averaged 40 m.p.g., and of all the entries, from the highest to the lowest, the average was 32 m.p.g.



A design on the same lines as the Franklin engine patented in England in 1906.

In this engine the radiating fins are cast vertically and enclosed in a jacket through which air is drawn by a fan on the flywheel. This principle is now used successfully on air-cooled stationary engines in America for pumping and electric lighting plants, and other

In answering this advertisement it is desirable to mention "The Motor Cycle."

Being Some Further Disjointed Recollections of Pre-war Trials by a Competition Manager.

GIVEN a memory, some imagination, and a copy of *The Motor Cycle*, and an ex-competitions manager now on war work finds an evening's entertainment in connecting up the past, the present, and the future. Just a par on the Current Chat page is sufficient to set the mind working. The news that a certain Capt. So-and-so has been awarded the D.S.O. brings back to mind the fact that before the war Capt. So-and-so was a competitions rider without title or rank. He was just Jack or Reg or Billy So-and-so, hail fellow well met, and a rattling good rider.

One has only to recall him riding in one of the classic events to bring back recollections of a hundred others, and incident upon incident crowd one's mind. Simple little incidents, most of them, but for some reason they have "stuck."

A "Good Samaritan."

I was reading the other day of the gallantry of a certain R.A.M.C. officer who went out in the face of heavy fire to help the wounded. His name was the same as a little West of England doctor I knew as an enthusiastic competitions rider. I remember him because he was kind to a pair of stranded riders trying to "fix" a three-speed hub in the middle of Salisbury Plain during one very wet and stormy London-Exeter Trial. Then my mind takes in the memory of another rider, the man for whom I was acting as sidecar ballast. This man was a cheery soul who could laugh and joke under all conditions. Any reader who has been through the Boxing Day event will know that anyone who can remain cheerful when the hub gives out, miles from anywhere, and it is raining cats and dogs and blowing a hurricane, must have a temperament bubbling over with good humour. I am afraid I was not so good-tempered. As I held the lamp and sucked the carbide off my fingers in an attempt to bring the blood into them, I swore softly and continuously like a cat with its tail imprisoned. But not so my friend, he sang "Get out and get under" at the top of his voice and told funny stories with the water trickling down his back while he sat in a pool with the wheel across his knees. Other riders passed us, some pulled up and grunted sympathetic platitudes, others only slowed up, while one or two stopped and offered a helping hand. Then came the little West of England doctor who handed us steaming cups of beef extract from a battery of vacuum flasks he kept in the boot of his sidecar. I always remember that little doctor with gratitude, and with him I always couple the memory of another good Samaritan, the rider of a lightweight in the last A.C.U. Six Days.

Friends in Need.

It was on the first day. Unfortunately we had put up at an hotel where they had conscientious objections to anyone breakfasting before eight. We went without our breakfast and started the trial on empty stomachs. Then came the Litton Slack fiasco. It will be remembered that the first dozen competitors monopolised the hill so long that the rest of us were herded like sheep at the foot of the hill and finally sent round another way. We eventually arrived at the lunch control five minutes before we were to leave again—just time enough to fill up. We called for sandwiches or anything else we could eat, but it was no good; we were on the point of starting again when the man to whom I refer divided his own rations which he was eating astride his machine while waiting for his number to be called. It was enough to satisfy for the time being. He did not know us—to him we were just castaways like himself, and he shared his last crust with us. It does one good to remember such incidents.

I always remember with kindness an episode which shows the sportsmanship of the trade rider. Many

Over the Hills and Back Again.—

times it has been said to me that the ex-tester trade rider is so familiar with his machine that he finds no pleasure or sport in the competitions in which he is entered. The episode I have in mind occurred in a Colmore Cup Trial, usually held over a Cotswolds course, which in the winter is quite as formidable, owing to grease, to a 3½ h.p. combination as the Scottish roads in summer time. I believe it was on Willersley. With any of these hills it is a case of dropping into bottom early, opening the throttle wide, and a prayer to the Goddess of Fortune to keep the back wheel from spinning.

The Human Element.

We started up that hill racing neck-and-neck with a trade rider on a twin Rex. Half-way up the hill, on the slimiest part, a big twin sidecar had konked out and had backed into the bank, barely leaving room for a machine to scrape by. The other man had the right of way, but he saw that it would be fatal to us to pull up and fall behind him, while with him it was a sporting chance; he shouted to us to go on and he pulled up, accelerating again when we got into line. That was sporting of him, and we were glad that he got through with a gold.

And so one incident brings up another, and one wonders what has become of certain other riders whose names flash across the mind. The cheery optimist who rode a Zenith in the last Scottish Six Days, and who, having lost his machine over the precipice at Applecross, buried his "Touchwood" mascot and raised a cairn to its memory. The two cheery cycle carists who, in the same trial, forded a river in their home-made cycle car rather than go round twenty miles when the flood washed away a main road bridge. Little incidents such as these single out various competitors and provide the human element. Instead of a dim and fading memory of a period of dust and engine din, one is able more or less to separate the trials from what would be just a confused impression.

It is easy for a man who has been through two or three trials to remember each trial separately, but to one who has been in many it is quite another matter. For example, I always remember the 1914 Bristol open trial for three reasons. It was at Easter, boiling hot, but we had anticipated mud, so we had fitted a combination tyre. The trial included Vale Street with its 1 in 2½ gradient. This street is a side street off another with a gradient of about 5 to 1, and it had a surface of asphalt for a few yards. By the time we reached Vale Street the tyre was of the steel-studded variety, and the wheel spun on the asphalt, spoiling an otherwise clean sheet.

In the same trial a trade rider of the Sunbeam combination, but not connected with the makers, had the misfortune to lose his sidecar tyre early in the day and finished the course on his rim. Notwithstanding that he made a non-stop run, and was top of his class in the speed test, he was disqualified.

The third incident of that trial was a "blind" along the main road at over 40 m.p.h. We had been taken round about the finishing point by a local motorist so that all should know when we were near to the park in which the trial finished with a speed burst. We were told to remember that a certain lodge gate was exactly two miles from the finish. We sighted a lodge gate and thought we were ahead of time, so went easy. Then a mile or so along the road we saw the proper lodge gate. The watch revealed that we had got a few seconds over three minutes to do two miles, and we blinded, turning into the park just on time.

Motor Cycle Gymnastics.

It is strange that my most clear recollections of the last A.C.U. Six Days consist of minor incidents, such as waiting at the foot of Litton Slack, the pantomime on Grindon Hill, which, soft as a ploughed field after heavy rain, caused many a solo rider to give fine exhibitions of riding. One man, a Humber rider, described at least a dozen circles without coming off; several times he was facing down the hill, and on many

A fine panorama in the Peak District. The sidecar is a Rover and the solo machine a twin Humber.

Over the Hills and Back Again.—

occasions his front wheel was among the bushes. I remember the narrow paved lanes among the dust bins behind the tenements, the descent of Jacob's Ladder, and Leigh Lane with its gulleys deep enough to bump the crank case. But the only real lesson it taught us was to see that one's valve cap is not long enough in the thread to come inside the combustion head. We broke a valve and all our tools in a vain attempt to remove the valve cap. We borrowed a three-foot spanner from the driver of a steam lorry and a sledge hammer from a blacksmith, but we should have twisted the engine out of the frame before that valve cap would move. In fact, it never moved again. We trained it back to Sheffield, tried again with all the conveniences of a first class garage, and finally fitted a new cylinder. Even at the works every known device was tried to remove it, and on breaking the cylinder we found that two or three threads of the valve cap extended into the combustion space, got carbonised up, and stuck the whole lot together as tightly as if it had been welded.

I recall, also, "pet" engines—engines that for some reason were better than their sisters, and when, by some mischance, cylinders blew off their head or were scored, they could never be replaced. Thus memories of machines as well as men are stored in one's mind, and no pleasant anticipation of future machines can completely wipe out one's affection for those that have gone.

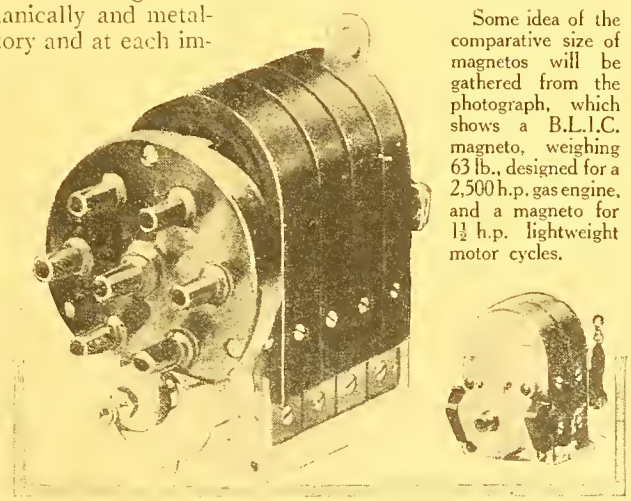
Round and round goes one's mind, once started there is no end, and most of the personalities who come within range of our thoughts are in khaki or blue. Several have "gone west," but among those who remain we may count men of all ranks from colonel to private, from temporary "lootenants" to A.B. seamen, to whom the most exciting trial or race is tame compared to the trials of warfare.

TESTING IN MAGNETO MANUFACTURE.

Some of the Faults likely to occur and the Means of Detecting Them.

THE following account of the testing of B.L.I.C. magnetos may be of interest in showing the care British manufacturers are taking to ensure the production of a perfectly reliable machine.

The arrangements made for testing the magnetos are very complete and thorough. The plan is consistently followed as far as possible of testing each separate material both mechanically and metallurgically as it enters the factory and at each important stage in its career. Small sub-assemblies are tested before becoming parts of larger assemblies, and the main components, such as armature, condenser, and the high-tension system leading from slip ring to distributer, receive exhaustive tests before ever they appear in the completed magneto. This method not only ensures absolute reliability in the finished product, but actually effects considerable economy by excluding faulty material from use at the earliest possible stage in its manufacture.



Some idea of the comparative size of magnetos will be gathered from the photograph, which shows a B.L.I.C. magneto, weighing 63 lb., designed for a 2,500 h.p. gas engine, and a magneto for 1½ h.p. lightweight motor cycles.

The testing of armatures as it is carried out by the B.L.I.C. is of particular interest, and is largely responsible for the reputation for phenomenal length of life and freedom from breakdown which their magnetos have earned. The insulating of a magneto armature is a much more arduous task than many electrical engineers have any conception of. We sometimes wonder what our transformer makers would say and do were they compelled to make 10,000 volt transformers to fit into a restricted space without the assistance in insulating them which is obtained by oil immersion.

Enamel insulated wire is used almost exclusively in magneto armature winding, bedding for successive layers being obtained in varnished paper and silk. The secondary winding has perhaps 10,000 turns or more of from 38 to 42 S.W.G. The wound armature is vacuum stoved, impregnated, and dried in the usual manner, and is then ready to undergo its first series of tests, which are carried out in the following order.

The continuity and resistance of the winding are first checked, the armature being rejected if the test shows that the wire has been unduly stretched during winding. A sparking test is next made with a mechanical interrupter, this being a delicate test for the "strength" of the spark obtainable under working conditions, especially at slow speeds; an armature is again liable to rejection if a minimum spark length is not obtained. Short circuits in the secondary winding are next looked for. These were at one time an unexplained source of trouble. Many users of Bosch magnetos have known cases when a machine after being for a considerable time in service, perhaps for many months became gradually "weak"; remagnetising did not improve it, and frequently accelerated an entire breakdown. The cause of these breakdowns is now known to be due to short circuiting in the secondary winding, and suitable apparatus has been devised which at once detects such faults.

It is not surprising to learn after this that the failure of a magneto while undergoing its duration run is an exceedingly rare occurrence, and that subsequent trouble when in service has reached almost the vanishing point.

CURRENT CHAT

TIME TO LIGHT LAMPS

GREENWICH TIME.

Oct. 17th	...	...	5.33 p.m.
,, 19th	...	...	5.29 ,,
,, 21st	...	...	5.25 ,,
,, 23rd	...	...	5.20 ,,

The Prince of Wales's Fund.

The Prince of Wales's Fund has reached a total of £6,443,856. Of this sum, £3,900,184 has been allocated to date for distribution for relief.

New York Exports.

Exports from New York during August were valued at £41,137,215, compared with £35,492,701 for August last year. The value of goods sent to England showed the largest increase.

The B.S.A. Post-war Programme.

Sir Hallewell Rogers says that when the war is over the B.S.A. Co. will be able speedily to turn on a new peace programme which will ensure the continued prosperity of the company. We sincerely hope all motor cycle firms are as confident and as well prepared.

Palladium Matinee in Aid of Wounded.

The Hospital Motor Squadron, working in conjunction with the Automobile Club War Service Scheme for Owner-drivers, have arranged for a grand matinée to be held at the Palladium on November 1st in aid of the Fund for Entertaining Wounded Soldiers. Among the artistes already secured are Miss Ruth Vincent, Harry Tate, Harry Weldon, Billy Merson, Marie Dainton, etc.

The Industrial Reconstruction Council.

A conference on "The Place of Conciliation and Arbitration in the Whitley Scheme" will be held, under the auspices of the Industrial Reconstruction Council, on Tuesday, October 22nd, at 6 p.m., in the Hall of the Institute of Journalists, 2 and 4, Tudor Street, E.C.4. The subject will be introduced by Mr. E. H. C. Wethered, of Bristol, after which the discussion will be open. No tickets are necessary.

Parcels for Troops.

The Postmaster-General reminds the public that perishable articles may not be enclosed in parcels intended for transmission to British, Colonial, or American troops serving abroad, and that semi-liquids and substances likely to become soft or sticky in course of transit, such as chocolate or sweets, must be packed in tins with the lids securely soldered down. Recently, neglect of these regulations has caused damage to the mails for the troops in France.

SPECIAL FEATURES

AIR-COOLING BY FORCED DRAUGHT. TWO NEW AMERICAN MODELS.
OVER THE HILLS AND BACK AGAIN.

British Four-cylinder Motor Cycles Wanted.

E. Ball, formerly head of the Service Department of the Henderson Motor Cycle Co., writes from France: "I had a ride on an English motor cycle, and guess I will stick to the four-cylinder 'Hen.'" It makes us regret that we have not at the present time an English-built four-cylinder machine which would give our American Ally a favourable impression.

Japanese Motor Cycle Police.

Owing to the increase in the number of motor cars in Kanagawa, Japan, the police authorities have recently decided to purchase three motor cycles so that the policemen may keep a strict watch on motorists exceeding the speed limit.

It is an extraordinary thing that while motor cycles are so extensively used by the police in the United States, and also to a lesser extent in Japan, they are not employed by the police in this country.

Japanese Trade.

That the Japs are keenly alive to motor trade possibilities is evident from the newly passed laws concerning motor vehicles and the erection of a twelve-acre motor car factory near Tokyo which will be completed this month. They have not yet apparently turned their attention to motor cycles, so those manufacturers who are interested in this market would do well to avail themselves of the present conditions, with an eye to post-war trade possibilities.

Petrolless Sundays in Eastern U.S.A.

We referred recently to the fact that motorists and motor cyclists are requested not to use petrol on Sundays in that part of the U.S.A. east of the Mississippi River. Everybody is asking out there why motorists living west of the Mississippi are permitted to indulge in undisturbed joy-riding on Sundays. "This is a secret exclusively enjoyed by the Fuel Oil Administrator," so our contemporary *Motorcycling and Bicycling* informs us. "It is only natural to assume, however, that he has some good reason else he would not ask such a thing. In the opinion of many, the Government would secure better results by issuing cards allowing each motor vehicle owner a limited amount of petrol per month," and here we are in entire agreement. Let us hope that, provided there is some petrol left over, the moment peace is declared we may be allowed to motor in moderation on the permit system which existed previous to November 1st last year rather than that we should be cut off from using our machines altogether, as is the case with the majority.

In a French city. An American D.R. crossing a bridge protected with barbed wire and sand bag ramparts

THE MOTOR CYCLE

AVIATION SECTION

Germany's Premier Biplane. M. Fonck's Record. Rations by Aeroplane.

Frankfort Bombed.

Frankfort Opera House has been destroyed in the Allied air raids.

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Major d'Annunzio.

Major d'Annunzio, who has been visiting the Italian sector of the French front and also General Berthelot's Army by aeroplane, has returned to Italy. His return journey occupied 3 hrs. 10 mins.

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Discharged Soldiers and Zeebrugge.

The president of the club for discharged soldiers at Dudley formally opened the door with a key made from a shell dropped by a German aeroplane while a British ship was shelling Zeebrugge.

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The Late Capt. Ball, V.C., D.S.O., M.C.

On behalf of the Aero Club of America, Mr. Calvin Hitch, the United States Consul at Nottingham, recently presented to Alderman Ball a bronze medal and illuminated diploma in recognition of the services of the late Capt. Albert Ball, V.C., D.S.O., M.C. Mr. Hitch predicted that American aeroplanes would soon be bombing German cities in large numbers.

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Germany's Premier Biplane.

A report prepared by the Technical Department, Aircraft Production, Ministry of Munitions, describes the Halberstadt two-seater biplane as probably representing the high water mark of two-seater aeroplane construction in Germany. It is well and strongly built, and its general behaviour in the air is good, according to modern fighting standards. It cannot be considered stable, there being a tendency to stall with the engine on and to dive with the engine off. Pilots report that it is light and comfortable to fly. Its manœuvring power is good, and this feature, taken in conjunction with the exceptionally fine view of the pilot and observer and the field of fire of the latter, makes the machine formidable as a two-seater fighter. Its climb and speed performances are poor, judged by contemporary British standards. It was found to climb 5,000 feet in 9 min. 25 sec., to 10,000 feet in 24 min. 30 sec., to 14,000 feet in 51 min. 55 sec., and to 14,800 feet (the greatest height reached) in 64 min. 40 sec. At 10,000 feet the speed was 97 m.p.h. with a 180 h.p. Mercédès at 1,385 r.p.m. There are two guns, one fixed and one movable. The gun ring is attached to the top of the fuselage by streamlined struts.

More Stunts.

Another trick known to fliers is that of "cartwheeling." The pilot stands the machine on its tail, and wangles the controls to make it fall sideways, so that when it comes out of the drop it is flying in the opposite direction.

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Two Engines on One Propeller-shaft.

A large Austrian seaplane which was brought down by the Italians recently near Venice is said to have had two engines working on one propeller-shaft. It would be interesting to know how these were synchronised.

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The New Hun Chaser.

It is reported that the Huns are employing the new Siemens Schuckert biplane chaser on the Western Front. This machine has an eleven-cylinder radial engine of 260 h.p., driving a four-bladed propeller. Two machine guns are mounted.

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A French Airman's Record.

M. Fonck, the French air champion, has brought down four machines in twenty minutes, and has now seventy officially registered victories to his credit. Unofficially, Fonck's record is stated to be one hundred and nine.

Food Rations by Aeroplane.

The fifth group of the R.A.F. played an important part in the Belgian-British push, by bombing the enemy, and also carrying a thousand food rations to the Allied troops when it was found difficult to get them forward by road.

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Destroyed by Own Bomb.

Catching a German bombing machine wriggling among our searchlights, a British pilot dived upon it. He used his machine gun at a few yards range. The German machine burst into flames and began to flutter earthwards. Suddenly the British machine rocked in the concussion of a tremendous explosion, and the German vanished in a blinding flash. One of its bombs had exploded, blowing the machine to pieces.

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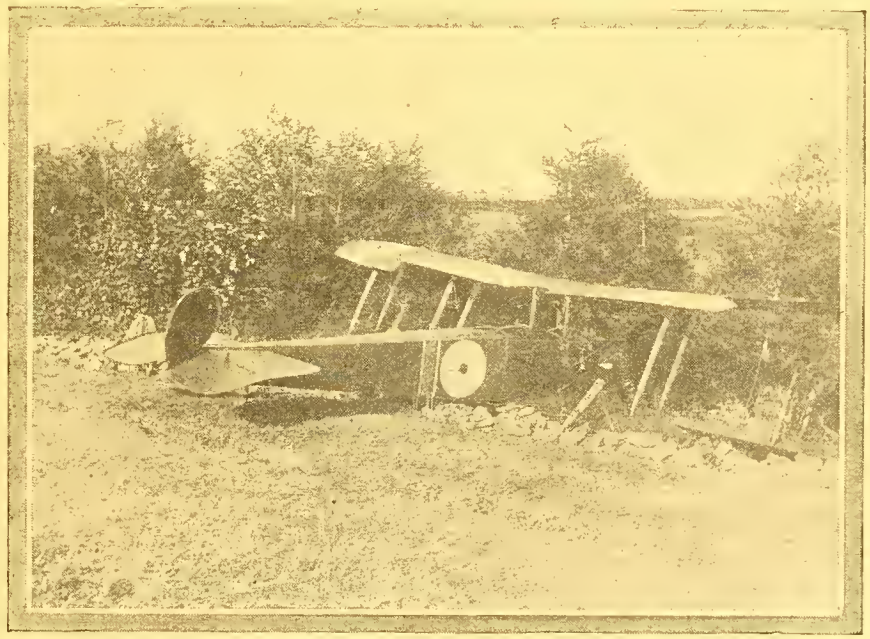
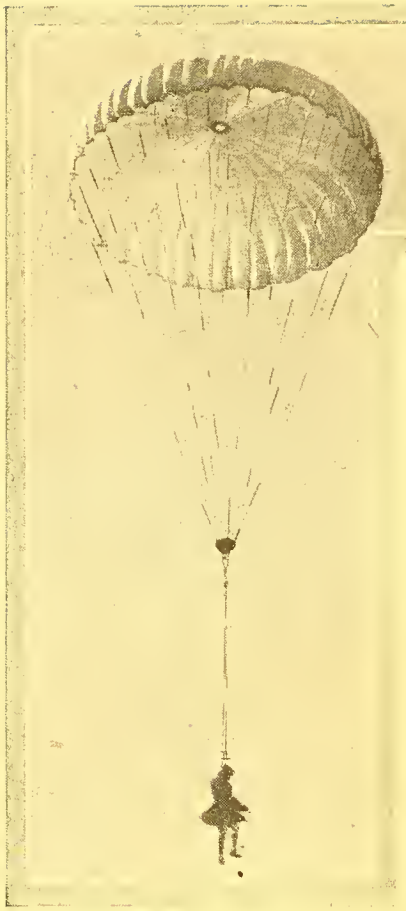
M. Sikorsky and his Work.

It is said that M. Sikorsky, the inventor of the monster four-engined Sikorsky biplane, with enclosed cabin, of which something was heard at the beginning of the war, is now connected with the Voisin Co. in France as consulting engineer. It is thought probable that he will devote himself to the development of big bombing machines, of an even larger size than those in which the Voisin people have always specialised.



A crashed British aeroplane which fortunately came down without injury to the pilot.



THE PROBLEM OF THE PARACHUTE

Why it cannot be Adapted for Use on Present-day 'Planes.

UNTIL last year there was no thought of fitting fighting planes with parachutes, for the simple reason that pilots absolutely refused to use them. Parachutes had long been provided for the escape of artillery observers from burning "sausage" balloons, and had proved so unreliable that observers usually remained in the car until the balloon was in flames, knowing that there was quite a sporting chance that the parachute might not open. Nowadays several parachutes are extremely reliable, of which the "Guardian Angel" is possibly the best known, and balloonists can take their perilous leap, when attacked by a Hun scout, with real confidence in a safe landing. The following are among the requisites of a perfect parachute:

(i.) It must open infallibly under any imaginable conditions.

(ii.) It must open after the shortest possible drop (a parachute which opens in 50ft. is obviously preferable to one which does not open until after a fall of 500ft.).

(iii.) It must be light in weight.

(iv.) It must be non-inflammable.

(v.) The harness must not impede the movements of the aviator, who already wears safety straps by which he is fastened to the cockpit.

(vi.) The harness must embody an infallible quick release, so that the aviator shall not be dragged through water, trees, or barbed wire on landing.

There is every reason to think that all these desiderata are attained in recent designs. The question of equipping warplanes with parachutes is thus at last open. As a matter of fact, the latest 1,200 h.p. and 1,500 h.p. Gothas carry nine parachutes, one for each member of the crew; and experiments made with the "Guardian Angel" type in England show that an aviator can make safe parachute descents from an aeroplane flying at extremely low altitudes (less than 500ft., for example).

Some of the Difficulties.

However, a great number of difficulties remain to be solved, and it is quite unlikely that parachutes will come into regular use on single-seater scouts during the present war. Some of the difficulties may be tabulated as follow:

(1.) There is a great scarcity of labour and material. Man-power determines victory.

(2.) Fighting scouts are necessarily designed with hardly a thought for the pilot's extrication in the event of a catastrophe. It is a tricky business to enter or quit many cockpits when the machine is stationary in the aerodrome. To wriggle out of a burning machine crashing earthwards at 300 miles an hour and to extricate simultaneously a bulky and complex arrangement of cordage and flimsy fabric is an impossibility.

(3.) The variety of design in aeroplanes is so enormous that innumerable types of parachute, carriers, cordage, and release gear would immensely complicate supply and design.

(4.) Before a pilot reaches an emergency in which a parachute might conceivably be of service his machine is usually more or less riddled with bullets. A very few bullets will render the best parachute useless. The addition of an armoured case for the parachute is indispensable, but would imply prohibitive weight, and further complicate the difficulties of release.

(5.) If a parachute is to be capable of quick release it must be mounted on the outside of an aeroplane. Since the addition of an extra Lewis gun or the use of circular wires instead of streamlined wire takes five to ten miles an hour off the speed of a machine, we cannot afford the extra wind resistance of an external parachute. Unless it was extremely compact and ingeniously mounted, it would nullify the efforts of engineers to produce more efficient engines and aeroplanes.

(6.) Every fighting plane is designed to give a particular combination of speed, climb, and strength. The success of the design is greatly affected by its weight. The weight is so carefully worked out that the number of cartridges to be carried is taken into account. Additional weight cannot be included without sacrificing factors which make all the difference between victory and defeat in an aerial battle. Therefore the planes must be designed for this extra load.

The Problem of the Parachute.—

(7.) The question of the morale of pilots has to be considered. It is not a healthy thing for a pilot to be perpetually wondering, "Has the moment arrived for me to jump?" Not in this spirit has the R.A.F. established its ascendancy over the enemy. Just as the deep dug-outs of the Hindenburg line have impaired the offensive spirit of the Hun infantry, so might the universal provision of perfect parachutes weaken the morale of the R.A.F.

To venture a prophecy, the adoption of parachutes on giant night-bombing machines is comparatively simple and unobjectionable. The crew can extricate themselves. The weight is immaterial, since speed and climb are less important in night work. The parachutes would save lives where a forced landing on bad ground in the dark became inevitable.

It would further be fairly easy to provide a parachute for the occupants of the rear seat on two-seater tractor machines. But whether a British observer could bring himself to desert his pilot in an emergency is surely questionable.

In the present stage of development it is impossible to give scout pilots this method of escape at the fifty-ninth minute of the eleventh hour: few of them want it.

Finally, it must be remembered that the parachute, if universally adopted, could not materially reduce the casualty lists of the R.A.F. The majority of deaths are probably accounted for as follows:

(1.) Crashes from a few hundred feet up in training or practice. In these cases everything is over in a very few seconds. If the parachute is theoretically releasable in a few seconds, the time is too short for: (*a*) the pilot to make up his mind; (*b*) and to clamber out; (*c*) and for the parachute to open before the ground is reached.

(2.) Crashes in aerial battles. In such cases the pilot is usually wounded or dead; and a parachute, if provided, would be damaged by machine gun fire before the moment for its use arose.

(3.) Landing crashes. A parachute could only prevent such casualties if the pilot knew well in advance that the nature of the ground or the damaged condition of his machine rendered a safe landing improbable.

THE AERIAL MAIL.

Possibilities of the Aeroplane Transport Service.

THE United States postal authorities apparently have every reason to be satisfied with the results obtained from the inauguration of the aerial mail. That such a scheme had its possibilities has never been doubted, and now that it has been proved commercially possible we may look forward to the promulgation of some similar scheme in England. Of course, the American scheme is only in its primary stages, and no attempt has yet been made to establish proper stations for receiving the mails other than by alighting in an aerodrome, so that considerable time is lost. Were proper arrangements made and structures erected it would be possible to start, say, from Edinburgh with a load of mails, call at York, and pick up some and drop others without much delay, and repeat the process at the various big towns *en route* for London. A big speeding up effect would be accomplished when once the thing was properly organised, and in addition much road and rail traffic would be conserved for the vastly increased post-war trade transport. The actual transport of heavy material by air is, of course, another proposition, and the cost in that case would be the deciding factor.

R.A.F. men at work on a wrecked German bombing 'plane that was brought down within our lines in France.

"TRENCHARD'S CROWD."

THE WORK OF THE INDEPENDENT FORCE OF THE R.A.F.

WHEN the Independent Force of the R.A.F. was first organised, jubilant Britons rejoiced that the Hun was at last to enjoy a taste of his own patent frightfulness. This jubilation has recently been toned down on more than one occasion when the "I.F." *communiqué* terminated in some such frank report as "four of our machines failed to return"; and one occasionally hears the question, "Is the game worth the candle?"

This question owes its origin to two sources, both of them bad. The one is the activity of the mysterious "hidden hand," ever seeking to weaken the authority of the strategists who know; the other is the sentimentality of kind-hearted but unintelligent persons, devoid of that ruthless logic which is essential in war, and who fret when they fancy men are being sent to certain death.

A contrast in bombs intended as Hun gifts to the Allies. They were delivered all right, but not in the form expected by the pilots of the wrecked Gotha.

Let us consider the work of the "I.F." It immobilises an immense force of Hun aeroplanes, gunners, and artillery. Imagine that this force should at any time become so formidable as to destroy in every week 100 I.F. pilots and fifty I.F. aeroplanes, worth—let us imagine—£2,000 apiece. Quite apart from any material damage inflicted on the Rhine towns, quite apart from any impairing of civilian *morale* in Southern Germany, this immense weekly sacrifice would be legitimate and justifiable. At present the weekly casualties of the I.F. remain absurdly light, as the R.A.F. envisage casualties; and they are likely to remain so in proportion to the *personnel* and material allotted to General Trenchard, because the efficiency of the I.F. steadily increases and the zone which it attacks is already vast and increases in area monthly. But if the weekly losses ever became enormous, the work of the I.F. would be worth while, even if it were reckoned apart from bomb-damage and injury to civilian *morale*. The explanation is simple. The huge anti-aircraft defences required for the raidable zone of Germany would cause the Allies an infinitely greater loss of life and material if they could be transferred to the Western front. At present these aeroplanes, gunners, and artillery, are dissipated over an aera of hundreds of square miles; the majority of them, perhaps, do not come into action more than once a week; when they are in action, their usual objective consists of a few elusive specks, flying at a vast height, and passing rapidly out of reach. If these forces could be transferred to the Front, the bulk of them would be almost continuously in action. Their objectives would be definite, and almost perpetually within range. The casualties which they could inflict in a given time would inconceivably outnumber those for which they are now responsible, and they would destroy Allied material in a similar ratio.

There is a very curious contrast between the anti-aircraft defences of London and of Southern Germany. London is, comparatively speaking, a small and compact target; but *the mere threat of a raid* immobilises considerable forces for its defence, even though we may have had no raid for six months. South Germany, by comparison, is an enormous target: the importance of the forces immobilised therein by Gen. Trenchard's continuous day and night attacks may be estimated, but hardly computed.

Few feats in warfare demand a more superb courage than a daylight raid of 100 miles out and home into enemy territory, over country which bristles with guns and is speckled with defending aerodromes. We read a few weeks ago how one of General Trenchard's squadrons was engaged in a running fight for the last seventy miles of its outward journey and the first seventy miles of its return flight; and we can guess that the survivors' ammunition must have been nearly exhausted when they shook off their determined assailants. We know, too, that every fighting pilot and gunner takes death as part of his day's work; but we remember with a profound gratitude that he hates captivity; and that captivity is a primary risk of this most risky duty. There is no fate that a British soldier shuns so much as a Hun prison, and there is no British soldier who runs such risk of capture as the Independent Force pilot.

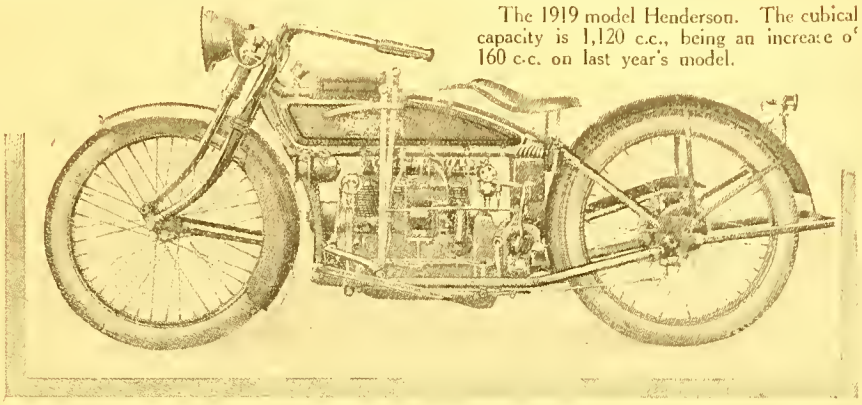
X.Y.Z.

NEW AMERICAN MODELS.

THE 1919 HENDERSON: Details of a Popular Four-cylinder Mount.

CONSIDERABLE stir was caused in British motor cycling circles a few years ago on the introduction of this machine, which was built on what were then considered decidedly heterodox lines. The chief drawbacks urged against it were the excessive weight, long wheelbase, and the supposed inefficient cooling. No such criticism, however, can now be made. Its many excellent features are fully appreciated by a big body of enthusiastic admirers in this and many other countries.

The Henderson, by the way, is now made in the same factory as the Excelsior.



The 1919 model Henderson. The cubical capacity is 1,120 c.c., being an increase of 160 c.c. on last year's model.

Increased Engine Size.

The 1919 Henderson has a bore and stroke of 69×75, giving a total piston displacement for the four cylinders of 1,120 c.c. approximately. The capacity is therefore about 160 more than the 1918 model.

The whole machine has been reinforced where necessary in consequence of the increased power output.

The Unit System.

While so much is being said about the possibilities of integral units, it is interesting to note the particularly compact and clean design obtained in this machine by the adoption of such a system. The engine and transmission units are distinctly on car lines, the engine, flywheel, multiple-disc clutch, and three-speed gear assembly being built and fitted into the frame as an integral unit.

Car Type Brakes

Another interesting feature is the provision of exceedingly efficient brakes of the band type. These comprise an inner expanding and outer contracting bands operating on a substantial pressed steel drum. Either brake is sufficient to lock the wheel under ordinary conditions. The brakes are independently operated, or may both be applied at once if desired.

Detachable Rear Wheel.

A new feature is supplied by the introduction of a detachable rear wheel. The convenience of this is already recognised by British users and manufacturers alike, and so will be duly appreciated. The system provides for the removal of the wheel without the necessity for interference with the chain or bearing adjustments.

The rear hub is similar to that used on the Excelsior for the past three years.

Petrol Consumption.

The Henderson is remarkably light on petrol consumption. During some trials last May, the two winning scores were 121 and 112 miles to the American gallon.

This machine, similarly to the Excelsior, is being offered in two models. Model Z2E has high-tension magneto ignition and electric lighting equipment, including independent generator, storage battery, electric head and rear lights, and electric horn, and is priced at £87 in America.

The other model, Z2, is the same in every detail, with the exception that the lighting equipment is omitted. This reduces the price to £77.

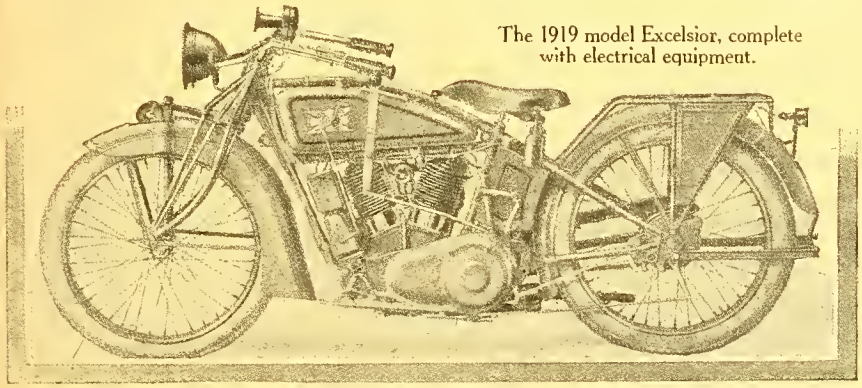
It will be noticed that in the case of the Excelsior the difference in the prices of the two models necessitated by the addition of the lighting equipment is only £4, while in the Henderson the discrepancy amounts to £10. This is due to the fact that in the Excelsior, as in practically all other American machines except the Henderson, the electric generator takes the place of the magneto, while in the Henderson the magneto is used on both models, and there can therefore be no allowance for it, as in other machines.

THE 1919 EXCELSIOR: Main Features of an Attractive Proposition.

THE Excelsior is one of the better known American machines on the British market, and during the past four years has obtained quite a substantial footing therein, and among those who admire the American types is something of a favourite, and too well known to require much amplification of its minor points.

In deciding on their 1919 policy, the Excelsior Co. lay stress on the fact that no radical alteration has been made on the previous model, and they do not consider any such alteration necessary merely as an innovation to distinguish it from last year's model.

One striking feature which greatly adds to the rigidity and strong appearance of the machine is the provision of the military type fork, which previously has been catalogued as an extra. As will be seen from the illustration, it is trussed to carry the great strains to which the fork is subjected in sidecar work particularly.



The 1919 model Excelsior, complete with electrical equipment.

Automatic Decompressor.

A feature that will appeal to those owners of big twins who are not of sufficient physical development to wrestle with the average kick starter is the automatic compression control. This operates by slightly opening the exhaust valves at the beginning of the downward thrust of the kick starter, and allowing them to close when sufficient momentum has been attained to carry the engine over compression. In addition to this, the starter sprocket is fitted with a spring cushioning device, which ensures easy and perfect engagement of the starter pinion.

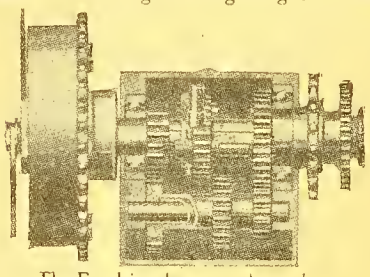
In order to obtain a compact assembly, the engine is brought up close under the tank. In order, therefore, to facilitate easy removal of the cylinders, the tank can be swung aside out of the way.

Although the cushioned sprocket is nothing of an innovation or confined to

New American Models.—

any particular make or type of machine, the Excelsior Co. lay stress on the efficiency of their particular design, which consists of six square section helical springs housed in slots in the sprocket, the portions projecting on either side fitting into recesses in the cover plates.

The clutch is of interest as being of abnormally large size; it runs on roller bearings, the whole being enclosed in a dust and water-tight casing. A good feature is the provision of hardened shell rings which form face plates to the thrust bearings and are easily renewable in case of wear.



The Excelsior three-speed gear box.

The Gear Box.

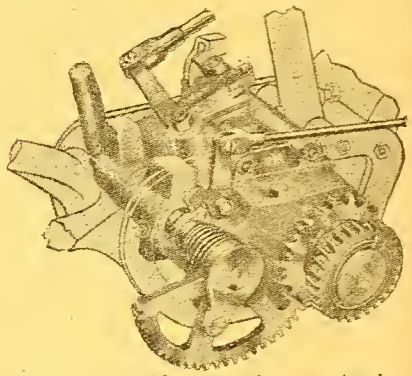
As will be seen from the illustration, the gear box is of substantial construction. The only point about which a query is likely to be raised seems to be the fact that the layshaft is hollow and runs on a spindle, being bushed throughout its entire length, and the single ball bearings seem somewhat light, but doubtless the whole has been well tried out before being standardised.

Only Two Models.

Only the usual two models will be marketed—Models 19 and 19E.

The former has the usual British type magneto ignition, and is minus the electric lighting equipment. The price of this model in the States comes out at about £70.

The 19E type has a complete electric lighting equipment, comprising Midco magneto generator, storage battery, electric head and rear lights, and electric horn. On account of the space taken up by this extra equipment, the tool case has had to be accommodated on the carrier. The price of this model in America is £74.



Kick-starter with compression control and cushioned starting pinion.

NOTES ON CARBURETTER DESIGN.

Putting the Cart before the Horse: Designing without Data.

I SHOULD like to present a viewpoint on the subject of the lines to be followed in the search for the perfect carburetter and the ideal one—which, in my opinion, will be a one-lever instrument.

First, we are all agreed that the great object in all human endeavour is, or should be, progress. And progress means simplicity; and there we stick! Simplicity of control or operation? The first from the amateur rider's idea, and the second from that of the engineer.

Perhaps it will be advantageous to discuss the functions of the ideal carburetting instrument and the laws which govern it in relation to the petrol engine.

Petrol engines were initially designed to work with a mixture of petrol vapour and air. The present-day engine is unchanged in this respect, but the fuel available has altered in its characteristics, so that even with the most modern carburetters it is not always possible to deliver it in the form of a vapour. If the fuel is introduced in any but a vaporised form, numerous difficulties arise. With engines having more than one cylinder it is practically impossible to conduct the partly vaporised fuel to the different cylinders in a regular and equal quantity. If it were in pure vapour form, or so finely divided as to be entirely air borne, it would respond to the successive suction of the individual cylinders exactly as does the air; but while portions of it gather in liquid form in the manifold or spatter on the walls at the bends, the further flow cannot be controlled, so that one cylinder gets a larger proportion of fuel than another. Another difficulty arises from the fact that the engine must vary in speed and torque.

It is usual practice to control this variation by means of a throttle valve at the entrance to the intake manifold regulating the fuel supply. When the valve is opened the air flow through it responds instantly, but the petrol has a distinct tendency to lag, giving a temporarily lean mixture. All questions of carburetter and intake manifold design thus rest upon the volatility of the fuel.

A tendency of carburetter construction is to accommodate the mixture proportion to the fact that proportionately less petrol needs to be fed with small air charges, when vaporisation is complete, than with large air charges. This began to be apparent several years ago in the tendency towards double-jet carburetters. Originally the two jets were intended to ensure a uniform mixture, though it is now known that they do more than that.

The application of heat is sometimes opposed on the grounds that it reduces volumetric efficiency by expanding the air charge. There is really no ground for this objection, since the temperature needed for good operation does not reduce the power to any noticeable extent.

General Requirements.

In practically every case the efficiency of a carburetter is tested and judged by the performance of the engine on which it is tested. As a standard of carburetter performance under running conditions this is not at all satisfactory, save as a comparison among various designs of carburetter. What is required is a definite standard of carburation stated in terms of the ability of the carburetting device to perform the functions for which it was designed. Here we have to contend with a possible difference of opinion regarding the division of the requirements from the carburetter proper and those from the induction manifold of the engine, both of which influence the quality of the carburation, and for this reason it is not advisable to enumerate *all* the functions the carburetter should perform. It will be generally agreed, however, that (1) it must be a good mixing device, (2) it must not in any way decrease the volumetric efficiency of the engine, and (3) it must be capable of supplying the engine with the best mixture of air and fuel at any speed and load of which the engine is capable. Taking the requirements in their order, the carburetter (1) should cause the proportion of fuel and air to be the same in all parts of the charge supplied to the engine. In order to do this to the best advantage, as much of the petrol as possible must be converted into a gas, and the remainder must be so finely divided that it will float as a fog. To gasify the fuel, heat must be applied, and this can be done either by heating the air or causing the fuel to impinge against a hot plate. Atomising also helps to gasify petrol. One of the best ways to accomplish this is to introduce the liquid fuel into a stream of air moving rapidly at right angles to it. After the fuel is properly atomised and gasified, it must be thoroughly and uniformly mixed with the charge of air.

(2) An ideally perfect carburetter would supply the mixture at atmospheric pressure and unheated. Under practical working conditions it is impossible to produce a carburetter for the present commercial petrol that will meet this requirement perfectly since condition (1) must be met. There must be an appreciable vacuum in the body of the carburetter in order to produce the necessary velocity to atomise the fuel, and the addition of heat is necessary to gasify the fuel sufficiently to obtain satisfactory performance, particularly in cold weather. Both the vacuum and the heated mixture reduce the volumetric efficiency of the engine, so that they must both be minimised as far as possible. More and better experimental data are needed in order to determine how to atomise the fuel to the best advantage and to gauge the amount of vacuum and heat necessary with any given fuel.

Given this, we can get on with the designing of the as-perfect-as-possible carburetter, and afterwards turn our attention to the manipulating of it with one lever.

MASCOT.

A Military Motor Cycle "Test."

It is rumoured that the Idea of Standardising Military Motor Cycles has been Abandoned by the U.S.A. Military Authorities.

RECENTLY on the other side of the Atlantic there was held a military motor cycle trial of such an arduous nature that at the end of it the practical motor cycle experts agreed that there was no motor cycle made which would come through the same ordeal without breakage.

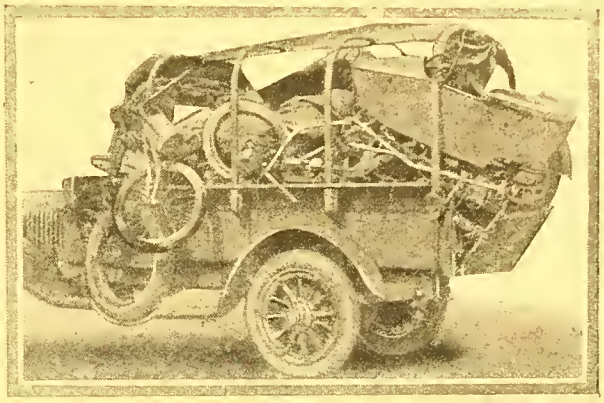
The Harley-Davidson flat twin, details of which are not yet to hand.

The test appears to have been instituted with the idea of trying to the utmost special motor cycles for war purposes, and it looks as if the U.S.A. Government is proposing to abandon these and adopt the British idea of employing standard models of a few principal makes with sidecars for heavy war work and some medium lightweight models.

Our informant states that the famous standardised Liberty motor cycle, combining the chief features of three existing American models, has been abandoned by the Government, and this is reasonably inferable from the fact that the board of expert engineers which has been at work at the Motor Transportation Department of the Q.M.C. in Washington was disbanded over a month ago. The board, it may be remembered, consisted of W. S. Harley (chairman), F. W. Schwinn, Oscar Hedstrom, C. B. Franklin, with Capt. F. C. Hecox and Capt. H. J. Lawes representing the Army. Of these, Mr. Harley, of course, is a member of the famous Harley-Davidson firm; Oscar Hedstrom is well known in this country as the Indian designer; while C. B. Franklin is an Irishman who competed in the first International Cup Race in France, and is now with the Hendee Company, and has often been seen riding Indians in important competitions in this country.

The Militor before the "test." Note the sidecar chassis

To revert to the trial, the machines which took part were two Powerplus Indians, two Harley-Davidsons, two Excelsiors, and two Hendersons, all with sidecars, while in the lightweight class are mentioned for the first time two Harley-Davidson flat twins weighing under 250 lb. each. Among the other machines may be mentioned the Militor, which was previously



An ambulance bringing in the remains after the "test."

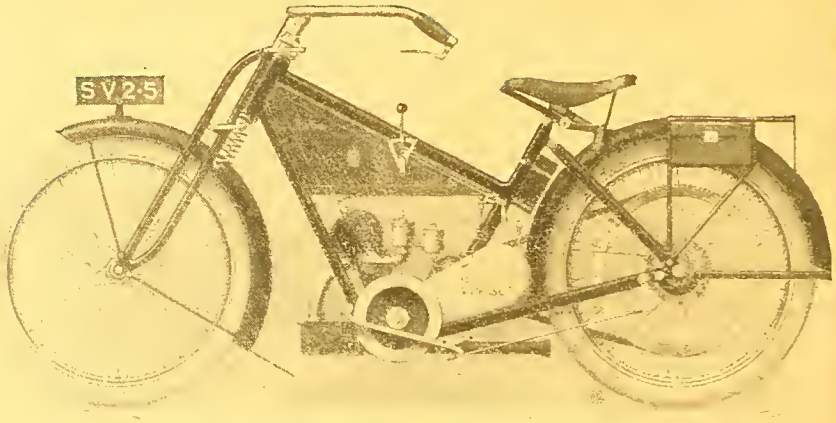
known as the Militaire and has been referred to in these pages. One was seen in London; we were told about it and given the registration number, but when after great difficulty we persuaded the registration authorities to disclose particulars of the engine, it turned out that the number referred to a Ford!

The Militor was built under the direction of officers of the Ordnance Department, and our American contemporary, *Motor Cycling and Bicycling*, thus refers to it: "It carried a lightweight sidecar, and the outfit weighed about 900 lb., looking like a cross between a German tank and a straw-burning locomotive. It was, in fact, not a motor cycle and sidecar, but a young truck with one disc wheel knocked off. It was claimed by the backers of this machine that it could push over a brick wall, climb anything that did not lean backwards, and easily carry a 500 lb. load at top speed under any conditions. Equipped with disc wheels and 3½in. tyres, its capacity as a combined truck and road-roller was shown by riding it slowly up against a stone slab, 8in. thick and about 18in. wide by 3ft. in length, stood up on an edge, and after pushing it over it climbed the stone and went on.

"Well, on the road test on June 11th, Lt. Chapple, the rider, was so thoroughly shaken and addled by the bumping of his short wheelbased heavily-laden mount, that he must have been glad to call it a day's work when the engine succumbed by over-heating."

ROAD TEST OF A NEW TWO-STROKE.

A Little Engine remarkable for Excellent Balance.



The Sun-Vitesse design intended for post-war production. The machine under test, however, had an old model frame fitted with the new engine.

TRIALS of new motor cycles are not often enjoyed in these days, and what follows cannot be called a description of a trial of a complete machine, but only of an engine, viz., the Sun-Vitesse. This engine is manufactured by the Valveless Two-stroke Engine Co., of 303, Broad Street, Birmingham, and was sent to us for trial by the Sun Cycle and Fittings Co., Aston Brook Street, Birmingham, who have the handling of the Vitesse engines.

As the frame to which this engine was fitted for experimental purposes was an old one, we do not propose to discuss it in detail, and it will suffice to say that it was comfortable to ride and possessed a Sturmey-Archer three-speed hub. We had the machine in our possession for the inside of a fortnight, and during that time rode nearly 250 miles on it. When it first arrived it seemed somewhat slow, for we have been accustomed of late to a more powerful machine. A slight alteration to the magneto timing, however, made a considerable improvement to the running, and the engine proved to be as fast as others of a similar class, while it is no exaggeration to say that it was without exception the most comfortable and best balanced two-stroke engine that we have ever ridden. At about 25 m.p.h. the machine would run very pleasantly over country roads. By this we do not mean to imply that 25 m p.h was its top speed, for we exceeded 30 m.p.h. on many occasions, 33 m.p.h. being the highest speed noted. A Stewart cyclometer was fitted, and as this seemed—possibly owing to the extreme smoothness of the engine—to exaggerate the speed, we tested it carefully between milestones at 20 m.p.h and found it to be quite correct

Hill-climbing.

We had no opportunity of testing the engine on really steep hills, but we rode up a fairly long hill with a grade of 1 in 12, which is a fair test of a small two-stroke's capability on top gear at a speed which did not drop below 19 m.p.h. On another occasion we took a light passenger up the same hill, using the middle gear for part of the ascent out of kindness to the engine, though we think that the highest gear would have sufficed to complete the climb. Several other short, steep hills in the Midlands were also ascended in good style on many occasions.

Simplicity.

The machine was used almost daily in rain or shine, and on one or two wet mornings an advantage of a hub gear on a belt-driven motor cycle was apparent, for when the wet belt was inclined to slip on a hill a change to middle gear made an immediate improvement, owing to the fact that the belt was then running at a higher speed compared with the speed of the road wheel, and at a lower tension.

We described the engine and the frame to which it is proposed to fit it after the war in *The Motor Cycle* of June 27th last; it is, therefore, unnecessary to go again into the details of construction further than to lay stress upon the fact that the engine is an extremely simple one, the crankshaft having but a single bearing of ample length. The bearing is mounted centrally in the cycle frame, so that the cylinder and crank case stand out slightly on one side and the flywheel and pulley on the other.

Good as the engine is, we are informed that several improvements are in hand which will be incorporated before it is placed on the market in its final form. We hope to give further details of the improved product later.

On the whole, we enjoyed our fortnight's running on the Sun-Vitesse, and were very sorry to part with the little machine when the time came for us to return it to its makers, for the more we rode it the better we liked it.

ECONOMISING MATERIAL.

THE shortage of metals and their high price may be the means of altering motor cycle design considerably. The evolution of everything is influenced by conditions, and if post-war conditions are such that certain materials are difficult to obtain, substitutes may be introduced which will alter completely the present trend of design.

A small maker, who at present is with the Colours, recently told me that, appreciating the shortage of metals immediately after the war, he is designing a sidecar combination to be constructed chiefly of wood. His proposition would be a three-wheel cycle car, following the lines of a sidecar combination. Metal would be used only in the engine, gear, and wheels, and, in a few cases, reinforcements to wooden members. Such a machine, made several years ago by an enthusiastic cycle car constructor, while looking very odd, was very efficient for ordinary purposes. It had a spring frame and a weird front wheel arrangement, but it worked, and was lighter than a similarly equipped "all-steel" machine.

FREELANCE.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

WANTED, A NON-RUSTING TOOLPROOF FINISH.

Sir, If "Ixion" will have some nuts made of the steel that is used in the manufacture of rustless and stainless cutlery, he will find that his requirement is filled. Knives that have been in use three years and are never cleaned with an abrasive are like new. Water, vinegar, and fruit acids fail to mark them in the least. The material is evidently an alloy steel. R.J.S.

PLUGS.

Sir,—I have had a 2½ h.p. J.A.P.-engined machine for three years, and have tried many plugs of well-known makes, as the engine showed every symptom of overheating, after careful checking of magneto and valve timing, etc. I was eventually advised, after writing to the makers, to try a Lodge racing plug, which I did, with unqualified success. Its extra cost is well worth while. I have, of course, no connection with Messrs. Lodge. I was at first sceptical, but am now converted. St.J.H.

Cheltenham.

PETROL FOR DISCHARGED SOLDIERS.

Sir,—Having read in the columns of *The Motor Cycle* the views of various readers regarding the release of petrol for discharged soldiers, I would like to say that from health reasons alone the Government should allow them a little of the "fluid."

Hundreds of men have been discharged through contracting heart trouble and minor lung troubles, especially among those who have served in Gallipoli and Mesopotamia.

These men are unable to ride an ordinary cycle because of the exertion. Motor cycling is recommended by many doctors as being a splendid way of filling the lungs with fresh air and bracing one up after a day's work. From personal experience, I know that tram and train riding causes severe headaches to men not up to concert pitch. I think, therefore, it would be a great help to those whose health has suffered in this way if they were granted sufficient petrol to take them into the country sometimes and so get a chance of a "brace up." It would clear away the depression from which the majority of these poor fellows suffer, and would, I feel sure, do much to help them on the road to health.

London, W GALLIPOLI.

EASY STARTING AND AIRTIGHT JOINTS.

Sir,—I have been interested in some correspondence and remarks of "Ixion's" anent easy starting of single-cylinder machines (or restarting with hot engine). Possibly (although a little late) the following may be of use or interest.

Personally, I have found setting of spark plug points of much importance. With a wide gap I may get easy starting when cold, but very difficult when hot. This I have noticed in three singles I have owned and used.

Also the petrol level is of importance. If set just a shade lower than normal I get easier restarting with a hot engine. (This tip I got from a lecture of Mr. Norton's some years ago, and have often found it useful since.)

With my present engine I find it an advantage to retard the spark when restarting with a hot engine. When cold, the position of the spark lever seems to be of little importance.

When fixing the carburetter to the induction pipe the use of a spirit level ensures that you get it quite truly upright.

A leather washer, soaked with seccotine, makes an absolutely airtight joint when an Amac carburetter is slipped on the induction pipe. (The leather washer is inside the carburetter and against the face of the shoulder which butts into the end of induction pipe.)

I admit if you use this leather washer it means remaking your airtight joint each time you take down the carburetter. But the same remark applies to the clumsier (and, in my experience, less effective) method of wrapping adhesive tape round the outside of the joint. Why cannot the makers fit joints that will automatically be completely airtight when the carburetter is fixed in its position? DUDLEY.

N.S.W.

DETACHABLE HEADS.

Sir,—I should like to hear the opinions of other readers on the following: "Are detachable heads a success?"

I ride a 3½ h.p. single which has a detachable head, and find that it is impossible to keep a tight joint! It may be slightly more convenient when tuning up; but then, on the other hand one feels afraid to decarbonise because of the difficulty in making a gas-tight joint! I may state that I use a new copper asbestos washer each time.

Personally I would much rather put up with a little more trouble required with a one-piece casting.

After a fast run I find the fins of my cylinder covered with burnt oil. Another disadvantage is that each time the head is removed it requires the adjustment of valve tappets.

Perhaps "Ixion" could give his experienced views!

Leicester. NON-DETACHABLE.

SPARKING PLUG TROUBLES.

Sir,—From time to time your correspondents relate curious troubles in connection with ignition. A recent discovery (at any rate, in my own experience, and forced upon me by a remote misfiring in a twin-cylinder engine) may be of interest to your readers.

The engine had been overhauled; and as it is one that is started directly by a starting handle, it necessitated that the points of one sparking plug should be very close together, otherwise no start could be obtained. The misfiring had occurred before, but with colder weather it became much more pronounced. All sources of trouble were carefully gone into, such as the inlet pipe being air-tight, new plugs fitted, valves ground, etc., but no solution to the trouble could be found, and it was quite by accident that the cause of the difficulty was discovered. Travelling one day on the dot and carry one system, another plug was fitted, and as the machine would not start by handle, it was persuaded to do so by a push, when, lo and behold, the misfiring ceased. However, later on no inducement of any kind would persuade the engine to start by handle until the plug points were brought nearer together when the same mysterious misfiring occurred.

After thinking the matter out, the only possible solution was this—and I have since proved it—that if the plug points are too close together, although they do not actually touch, this will undoubtedly be the cause of misfiring, although the plug may be otherwise quite sound. I have overcome the difficulty of starting and misfiring by putting two plugs in one cylinder, with a switch to throw the current into the wide gap plug after starting and cutting out the other plug.

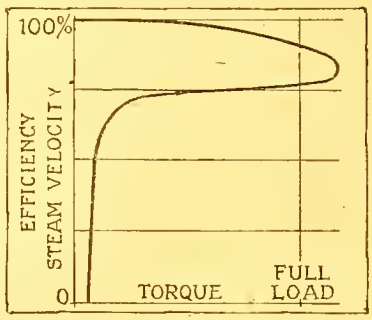
I am particularly interested to know whether this phenomenon has come under the observation of any of your numerous readers. LEONARD JONES.

[Many years ago we cured misfiring in a small twin in the manner indicated, viz., by setting the plug points further apart.—ED.]

THE MIXED TURBINE AS A MOTOR CYCLE POWER UNIT.

Sir,—In your issue of September 19th "G.H.P." broaches a subject of considerable interest to engineers in general apart from motor cyclists. May I, therefore, be permitted to pass a few remarks on the subject from an engineering standpoint, as well as from that of the motor cyclist.

The *bête noire* of the proposition is, of course, the thermal efficiency of the "pressure generator." Assuming, however, that an efficiency of sufficient value to make it a commercial proposition be attained, the question of auxiliary apparatus requires rather more consideration than "G.H.P." accorded it. Thus the air pump would require to cope with about 25% of resultant volume of steam and CO_2, and require about 33% of the total power output of the turbine to drive it, though about three-fifths of the 33% would be recoverable, affecting dimensions rather than efficiency. Since, to bring the working temperature of steam and gas within reasonable limits, the ratio of steam to CO_2 will require to be not less than as 2—1, condensing could not be ignored if the maximum possible efficiency were to be attained—in fact, considering a turbine being used, and an impulse wheel at that, condensing becomes a *sine quâ non*. Apart from the interference to normal condensing, the presence of such a comparatively large quantity of gas (CO_2) to steam would call for an abnormally large vacuum pump as compared with ordinary condensing. Consider that the mass of condensate, in this case air, requires to be about forty times the mass of steam to be condensed, the mere question of condensing practically puts the idea out of court for the motor cyclist.



The torque curve of a turbine.

Concerning the characteristics of the turbine, particularly the impulse turbine, "G.H.P." makes two misstatements, "The turbine could be started on load if necessary." The torque curve of a turbine is roughly as sketch.

Since the steam velocity of a given nozzle will vary only within very narrow limits the maximum efficiency slip-speed is practically constant. Speed then may only be varied at the expense of efficiency, and, as a consequence, power and torque. A clutch and gear train would be an absolute necessity in view of this utter lack of flexibility. And as to cost—well! With all due consideration to original ideas, even torque could be attained, I think, at a very much lesser cost than the proposition in question would demand.

B.E.F. A.G.A.K.

LEAKAGE OF MAGNETISM.

Sir,—I have noticed that a great many readers have had trouble with Dixies and leakage of magnetism. This is not a theory, but is an actual fact.

I offer the following as the solution, for I, too, have had the identical trouble. To make my point clear I must go to some length.

The Dixie was originally designed for simplicity of parts, no complication, impossibility of armature trouble, and an equal sparking density at all positions of the advance and retard quadrant.

The result was complicated magnetic phenomena, caused by a "dead" point; hence, the magnetic flux goes the "easiest way home."

To explain this and clearly show my point, take first an ordinary magneto armature. Here you have the magnetic flux alternately passing the armature case and the windings without any course for diversion, load contact, or other impedimenta under natural circumstances. (I am not dealing with highly complicated data of high armature speeds and "flux back lash" or eddy currents.) But in the Dixie, here you have a roller which alternately passes the flux through itself and the windings in the horseshoe above it.

Now comes the crux of the whole argument. First, it is impossible under these circumstances for highest spark efficiency because there is never such a "kick" in such a long way round.

Secondly, as the magnetism has to change over from a good to a bad part practically instantaneously, it is, to use a figure of speech, pulled up with a jerk, so that it must find some vent, with the result that it escapes in the conductivity of the steel driving wheels or chains as the case may be, so that the spark has not the power to jump the gases under pressure.

The only cure for this is to fit a brass sprocket — or pinion wheel as the case may be, so that there is no metal of any description which can conduct magnetism away from the magneto.

If this is tried in even a weak Dixie it is wonderful how it will pull up. J. P. J. CHAPMAN.

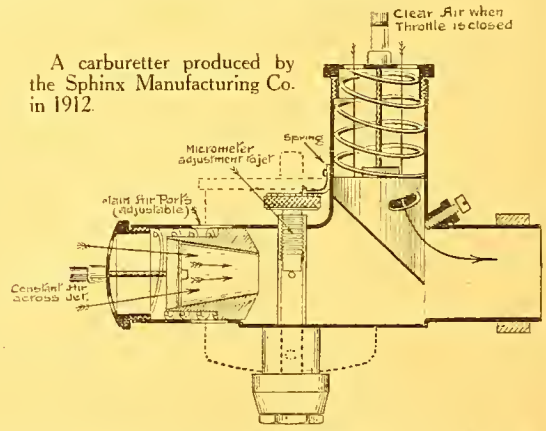
ONE-LEVER CARBURETTERS.

Sir,—We are interested to see in your issue of September 26th, on page 293, a sketch by Mr. C. R. Eastwood of a one-lever carburetter. Some years ago we conducted a long series of carburetter experiments, which we were compelled to lay on one side owing to the rapid growth of our sparking plug business and the necessity for the concentration of all our available capacity to plug production.

Our interest in the present design was aroused by similarity of arrangement of air intake and cold air admission to the engine when the throttle is closed, but Mr. Eastwood has produced a one-lever model which we should say from inspection of the design would embrace all the virtues of our two-lever type by the arrangement of his throttle.

We should like to suggest as an improvement to his design that extra air might be admitted horizontally behind the throttle, so that it would only be available after the throttle had been raised a certain distance.

A carburetter produced by the Sphinx Manufacturing Co. in 1912.



As a matter of interest we enclose you a drawing of the carburetter we produced in 1912. Bearing upon the efficiency of Mr. Eastwood's design, we may say that this two-lever model gave every satisfaction in use, was economical in petrol, and very great power was available owing to the facility with which the jet might be adjusted by the driver while running. It will be observed that a minimum amount of fixed air enters through the cone immediately behind the jet. The withdrawal of this cone opens air slides arranged around the intake and still behind the jet, at the same time relieving the suction on the jet. Very easy starting was attained as a result.

The adjustment of the jet is very simple. The jet proper consists of two apertures drilled across a tube. The interior of this tube is screwed, and the adjusting screw (threaded forty to the inch) adjusts the aperture by means of calibrations similar to a micrometer. The head of this screw is calibrated with twenty-five notches, into one of which snaps a spring fixed to the outside of the carburetter. The movement of this adjustment right or left, one notch, equals an increase or decrease of jet aperture one thousandth inch (*i.e.*, one complete thread equals one fortieth inch: one twenty-fifth of one fortieth equals one thousandth). There are no patents attaching to the design, and if any of the features are of sufficient interest to Messrs. Tilston Engines, Ltd., or any other interested parties they are at liberty to use them.

THE SPHINX MANUFACTURING CO

THE THREE-JET BINKS CARBURETTER.

Sir,—Like your correspondent "W.S.B.," I had trouble with a dead spot in my Binks carburetter. By the careful use of a small, round file, I enlarged the ends of the second pilot jet choke tube until, when the throttle was raised to bring the main jet into action, the engine was still drawing air through the second choke tube. In other words, at one position of the throttle ("W.S.B.'s" dead spot) my second pilot and main jets are both working, and by means of this slight alteration I have completely cured the dead spot. My machine is a Brough horizontal twin, and the Binks carburetter is now in every way satisfactory; but one must have patience with it, and try various combinations of jets before complete satisfaction is obtained. My acceleration is violent; my consumption is over 100 m.p.g., and I have a tick-over in neutral unequalled by many cars. I have no interest whatever in Messrs. Binks, other than that of a satisfied user of their very excellent instrument.

There is only one point that might be improved. Cannot Mr. Binks supply a neater type of control, with ebonite-tipped levers? G 6156.

Glasgow.

THE BEST POSITION FOR THE CLUTCH.

Sir,—I fear that "Chinook," having been caught making what he knows to be an erroneous statement, has cast about for some excuse with which to justify himself before the lay reader. In the interests of truth, therefore, I must say that almost every statement he makes in his article is incorrect.

In the first place, then, I deny that "experience has shown that in present-day motor cycle design the countershaft is a more satisfactory and convenient position for the clutch than the engine shaft." "Chinook" has had no experience of a good clutch of modern design fitted in the latter position, apart from one example of the multi-plate type. He likes the countershaft clutch because of the fact that it is of the dry plate type; could he try a dry-plate clutch on the engine shaft he would like it even better. As for his idea of using a half-engine speed clutch for a four-cylinder unit, I can only suggest that he should see what his technical colleagues on *The Autocar* think of his idea. His reference to the width of the clutch I do not understand.

All his arguments on the subject of wear are useless, because he starts out with a fundamental assumption that is entirely wrong. Given clutches of similar design, and using equal spring pressures, with the same margin of safety, fitted to engine shaft and countershaft respectively, the relative lineal speeds of the friction surfaces will be identical. In fact, the engine shaft clutch, while it is certainly a high revolution clutch, is not a high speed clutch at all in the sense in which "Chinook" attempts to use the term, so that even if speed did affect wearing qualities, the engine shaft clutch would be no whit inferior to the countershaft type on that score. A good designer, however, would realise that speed does not affect, to any noticeable degree, the wearing qualities of modern friction materials, so that he would most likely make his clutch nearly as large in diameter as the countershaft type, and thus, for the same weight as the latter type, obtain the great advantages of light spring pressure, lessened wear, and a hugely increased margin of safety in power transmission. "Chinook" apparently realises this, for in the last sentence of his third paragraph he commends this type of clutch, which is really a high speed type. Thus in his second paragraph he declares that high speed is the essence of all evil, and in his third commends as excellent the only high speed type there is.

There is no need at all to make a compromise between the hub clutch and the engine shaft clutch, for the former is utterly wrong, while the latter, as far as I know, has no disadvantages at all. His argument anent the use of a clutch as a shock absorber is distinctly amusing, and it hardly seems necessary to point out that an engine shaft clutch insulates the front chain from shock which the countershaft type does not, and that there is no difference in the amount of slip caused in the two types if other things are equal. "Chinook" seems to have got hopelessly mixed up between revs per minute and feet per second, and if he will just get these two things separated in his mind he will no doubt realise that his article is hopelessly wrong. The engine shaft clutch is the best type on all grounds, both of theory and practice. BOB-WEIGHT.

Kenilworth

AIR V. WATER-COOLING.

Sir,—To those who have tried both, there is no question as to which is the more satisfactory system in practice. Your correspondent "Vedette" speaks of the "complication" involved in water-cooling, and this is no doubt true of the machines at present on the market. By the simple plan of casting fins *on the water jacket* the amount of water required for cooling can be reduced to a minimum, and therefore a very much smaller and stronger radiator than those at present in use can be fitted. One point is important—the interior of the water jacket must be thoroughly galvanised, otherwise the thin walls of the cylinder soon get eaten through by the rust formed. It is extraordinary how few motor engineers seem to know the effect of the application of water to iron or steel. Galvanising is cheap enough and should be applied to other parts of a motor cycle—rims, rods, etc., wherever rust is likely to form.

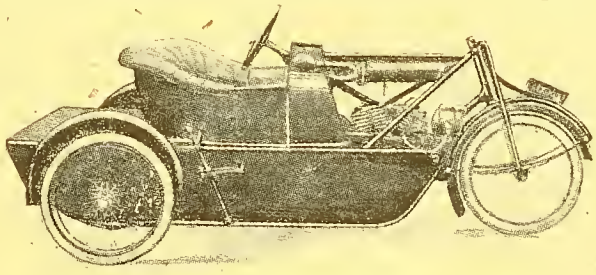
My ideal sidecar machine would be a water-cooled big single of 1,000 c.c., with outside flywheel and shaft drive. By fitting flexible spring couplings in one or more places in the shaft and a shock absorber also in the back wheel the shaft drive can be made as smooth as a belt.

One other point not referred to by your correspondent is the well-known tip of filling the radiator with boiling water on a cold morning, thus making starting up as easy as in summer time.

I ran a 3½ h.p. water-cooled Humber combination for some 4,000 miles, and the "no trouble" qualities of that engine were an eye-opener to anyone only used to air-cooled machines. I never had cause to touch the valves or plug, and, after running the machine for a season, sold it to a friend who had never ridden before, and he covered about the same distance without changing or grinding a valve or replacing a spring or plug. The only drawback that I see to water-cooling is that the engine runs so cool that it is not a success on paraffin. M. HITCHCOCK.

CHOICE OF THREE-WHEELERS.

Sir,—A correspondent, "Rif-raf," in a recent issue, complains that there is no choice of three-wheelers, and states that some of his friends say, with reference to the Morgan, that it is perfect, while others say it will turn over in grease.

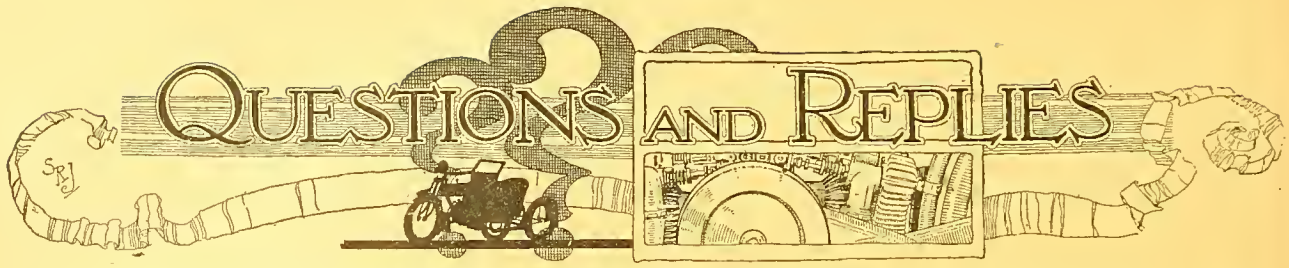


The 8 h.p. Robertson three-wheeled cycle car mentioned in "H. W. S.'s" letter.

I have seen advertised (in 1915) what appears to me to be an excellent proposition, called the Robertson, made by James Robertson, of Cross Street, Sale, Cheshire. It is a three-wheeler similar in weight and power to the Morgan, but with the single wheel leading, the drive being through the rear wheels, a light differential gear being fitted, which seems to me better than the one wheel at the rear doing all the heavy work—braking and driving—and also easier for tyre repairing; also, I believe the chains were enclosed—a great improvement on the open ones. The engine was an air-cooled 965 c.c. V twin; the body was of pressed steel, and could be tilted up to give access to the transmission. The machine was claimed to be very steady on the road, and practically a non-skidder. Economy in running was also given as a good feature, and 70 m.p.g. and a mileage of 14,000 for tyres should support this claim. I do not know whether this machine is to be made after the war; but to a motor cyclist like myself, who wants a little more protection from the elements, and yet wants the economy of the motor cycle, this machine seems just *it*, and better, in my judgment, than any similar machine.

I enclose a print taken from a 1915 list of cycle cars, etc., hoping it may interest "Rif-raf." H.W.S.

Dursley.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Storing a Motor Bicycle.

Will you have the kindness to advise me what steps I should take to preserve the radiator and water jackets of my Scott motor cycle, which, it now seems likely, will not see the road again until the millennium arrives? It has been lying idle for over a year as it is. I am very loth to sell, but I do not want to see the machine rusting away to worthlessness.—F.P.

All you can do is to see that the radiator and cylinder jackets are completely drained of water and filled with paraffin, which will prevent internal rusting. As regards the rest of the machine, it will be desirable to keep both tyres off the ground, and all bright parts or any parts likely to rust should be smeared liberally with vaseline, and the whole covered over by a sheet.

Magneto Lamp Lighting.

I have noticed of late a few advertisements in *The Motor Cycle* concerning magneto electric lighting, and, being an engineer, and having a little knowledge of electricity, I wish to fit my own cycle with a similar device. I am sending a sketch which shows how the wires run. My machine is a 3-5 h.p. B.S.A. and has a Bosch magneto. (1.) If a short occurred, is it possible to burn the armature? (2.) What size candle-power lamps should I use? Would an eight-volt and .5 ampère lamps do?—C.F.T.

(1.) We are afraid your knowledge of electricity is altogether too slight to enable you to carry out your object. The current in the circuit that you depict in your sketch would at a normally high engine speed approximate something like 10,000 volts, whereas you suggest using an eight-volt bulb. A continuous short in the secondary circuit might damage the armature. (2.) Your idea might be carried out in a very different way by using the primary current of the magneto, *i.e.*, by taking the lead from the terminal on the contact breaker and by interposing between this lead and the lamps a special choking coil. The construction of the coil involves a certain amount of knowledge and experience, and also the system would necessitate the use of a dry battery or accumulator to light the lamps while the machine is stationary. Such an apparatus as you would require may be obtained, ready for fitting to the cycle, from Messrs. F.R.S. Lamps, Ltd., Pershore Street, Birmingham.

Magneto Conversion.

I have a twin-cylinder magneto which I want to fit to a single-cylinder engine. Will you please tell me how to proceed?—R.M.G.

All you need do is to remove one of the cams from the contact breaker ring. This means the magneto will give only one spark per cycle, and you may connect up the lead carrying the current to the plug and time the ignition in the ordinary way. The other lead, which, of course, as the cam has been removed will carry no current, may be taken off the magneto, but the hole through which the carbon brush was inserted should be covered up. Perhaps the simplest way to do this would be to cut off the high-tension wire close to the carbon brush mounting.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to app ar in this publication, either during or after the war.

ILIFFE & SONS LTD.

The Local Taxation Licence.

My local taxation authority refuses me exemption from motor cycle licence duty. I go into the country seeking orders and delivering goods, using a Matchless combination delivery box with name and business painted thereon. I have also steel pins driven through the connections attaching the sidecar chassis to the motor cycle to conform with the regulations respecting the use of commercial vehicles of this type. Their excuse is that I may at any time detach the motor cycle and use it for private purposes. I am allowed petrol only for commercial use, and every drop goes to this end. Have I a just claim to exemption from the motor cycle licence duty and petrol (duty free)?—REJECTED.

The licensing authority is quite in the wrong, and we think that if you continue to use your machine without paying the local taxation licence and ask the Auto Cycle Union to take up your case you have every chance of winning it. If no local taxation licence is paid you need not pay duty on your petrol.

A Registration Query.

On June 27th I exchanged my A.J.S. combination for a Morgan Runabout, and have since written to the chief constable asking for the registration numbers (CX 1406) to be transferred to me. His reply is that the gentleman from whom I got the Morgan is not the registered owner, and requests the sum of 10s. from me for the double transfer. Am I liable for this sum? I thought the transfer for this type of vehicle was only 1s. Would you be good enough to explain my position in the matter?—J.M.S.

The demand to which you refer seems very much like another example of over-reaching on the part of the police. You are certainly not liable for the double transfer, and if you care to let the case come into court you will find yourself only ordered to pay for one transfer fee of 5s. The registration of a Morgan is regarded by some authorities as coming under the motor cycle classification, in which case the fee for a new number is 5s., and for a transfer under existing number 1s. Other authorities regard it as coming under the same heading as cars, in which case the fee for a new number is 20s., and for a transfer 5s. The authorities who take up the latter point of view are perfectly justified, as the weight of the Morgan is over 3 cwt. The person from whom you bought the machine ought to have registered it in his name, and if you let the case come into court he will get into trouble, and not you.

RECOMMENDED ROUTES.

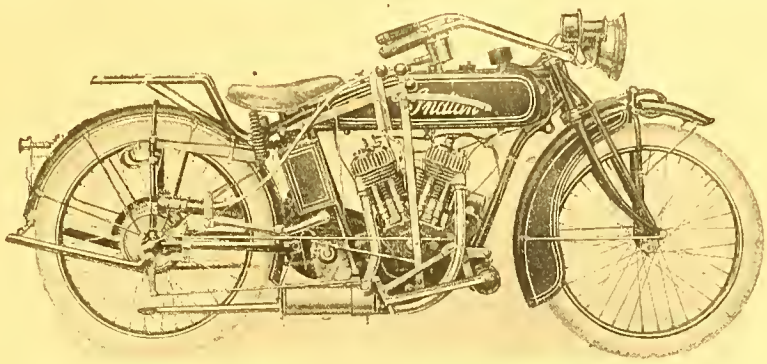
TONBRIDGE TO THE LIZARD.—J.A.B.

Tonbridge, Tunbridge Wells, East Grinstead, Horsham, Guildford, Hog's Back, Farnham, Odiham, Basingstoke, Whitchurch, Andover, Amesbury, Hinton, Wincanton, Ilchester, Ilminster, Chard, Honiton, Exeter, Crediton, Bow, Okehampton, Launceston, over Bodmin Moor to Bodmin, Lanivet, Fraddon, Ladock, Truro, Helston, Cross Lanes, Lizard.

KEIGHLEY TO EXETER.—H.W.

Keighley, Bradford, Wakefield, Barnsley, Sheffield, Bakewell, Ashbourne, Uttoxeter, Weston, Stafford, Newport, Shifnal, Bridgnorth (the Falcon Hotel), Kidderminster, Ombersley, Worcester, Severn Stoke, Tewkesbury, Gloucester, Stroud, Nailsworth, Bath, Marksbury, Chewton Mendip, Wells, Glastonbury, Durston, Taunton, Wellington, Cullompton, Exeter. Approximately 290 miles.

We regret that we are not in a position to supply motor cycles at the present time. But we can send a 1918 descriptive list on application. *This applies to Great Britain only.*



HENDEE MANUFACTURING Co.,
"Indian House," 366-368, Euston Rd., London, N.W.
Telephone: Museum 1619.
Telegrams: "Hendian, Euroad, London."
AUSTRALIA—109-113, Russell St., Melbourne.
CANADIAN WORKS—13-14, Mercer St., Toronto.
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 579, West St., Durban; Indian House, Strand St., Port Elizabeth

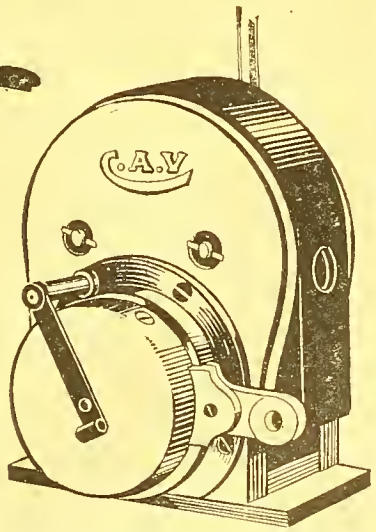
1918 Indian Powerplus

Electrically Equipped.

Trustworthy Service

The C.A.V. MAGNETO is now undergoing the severest test of all—ACTIVE SERVICE—Proving daily its splendid reliability in all climates and under all conditions . .

C.A.V. Magnetos
BRITISH THROUGHOUT



C. A. VANDERVELL & CO., LTD.,
Electrical Engineers :: ACTON, LONDON, W.3
Members of the British Ignition Apparatus Assn.

MISCELLANEOUS ADVERTISEMENTS

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

A.J.S., 2¾h.p., 3-speed countershaft, excellent condition, speedometer, lamp, etc., £42; 2-speed ditto, £35; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [8750

1916 6h.p. A.J.S. Combination, 3-speed, in new condition, with spare wheel and tyre (unused), speedometer, wind screen, and luggage grid, tyres original in new condition, done under 2,000, warranted perfect; £95, cost £130.—Perry, 391, High Rd., Ilford. [8781

1918 6h.p. A.J.S. Combination, bought 3 weeks ago, F.R.S. electric lamps, hood, screen, 2 spare valves and chain, spare wheel, etc., run only a few miles, absolutely new, latest, and finest outfit on the road; lowest £147, or exchange smart 2-seater car; compelled to buy a car through health, only cause for sale.—Wort, 16, Fullbrooke Rd., Cambridge. [X8807

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4997

Alldays.

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8760

New Models
—AT—
GODFREY'S

NEW 1918 MODELS.

8 h.p. War Model **MATCHLESS** Combination	£125 0
5-6 h.p. **JAMES** Combination	£104 0
3½ h.p. **JAMES** twin solo model	£79 0
4¼ h.p. **JAMES**, single-cylinder	£79 0
3½ h.p. **ROVER**	£80 0
(All the above have 3-speed gears and kick-starters.)	
3½ h.p. **ROVER**, T.T. model, with Philipson pulley	£67 10
*2½ h.p. **LEVIS**, Model E, 2-stroke, 2-speed	£17 10
*2¼ h.p. **LEVIS**, Popular Model, 2-stroke	£32 0
(* Permits required.)	
2½ h.p. **DIAMOND**, 2-stroke, single-speed	£31 10
2½ h.p. **DIAMOND**, 2-stroke, with countershaft 2-speed gear	£38 17
2½ h.p. **LEVIS**, single-speed, belt-drive	£36 15

Second-hand Machines and Combinations.

You can always rely on GODFREY'S.

Write for full Lists.

EXCHANGES. EASY TERMS.

GODFREY'S, Ltd.,
208, Great Portland St.,
LONDON, W.1.
'Phone—7091 MAYFAIR (2 lines).

Electric Adapter
Price **4/9** each.

Spare Bulbs, 2/- each.

This is a small fitting to enable owners of gas lamps fitted with burners of the Roni type (round stem) to make their lamps into electric.

The "adapter" fits over the existing burner with a tight fit, and is connected to an electric wire and battery.

F.R.S. LAMPS, "BEAM" WORKS, PERSHORE STREET, **BIRMINGHAM.**

This Book will tell you all the special advantages of my Coveralls. It's worth having.

Write me for a copy.

IRVINE SMITH,
Buttershaw, Bradford.

DEFENCE OF THE REALM ACT

Under the provisions of the above Act, advertisers requiring workmen, and whose business consists wholly or mainly of engineering or the productions of munitions of war, or substances required for the production thereof, and whose works are situated within 30 miles of London, must include in every such advertisement the words, "No person resident more than 10 miles away, or already engaged on Government work, will be engaged."

Advertisers whose works are situated more than 30 miles from London can only have their announcements inserted with the approval of the Board of Trade, who will allocate to each advertisement a box number, and collect and distribute to the advertiser all replies received. The necessary forms of application can be obtained from any Labour Exchange or from the offices of this paper, and each advertisement must contain a clear reference to the effect that no person already engaged on Government work need apply.

MOTOR CYCLES FOR SALE.

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

Auto-Wheels.

WALL Auto-Wheel, in good running order; £6/10 or near offer.—3, Jackson Rd., East Barnet. [8810

Bradbury.

BRADBURY, 1913-14, 4h.p., enclosed Bosch, F.E. clutch, new tyres, runs splendidly; bargain, £19/19.—Jackson, 143, Ravensbury Rd., Earlsfield. [8810

B.S.A.

B.S.A., 1914, 3½h.p., good condition throughout; £22/10.—127, Clapham Park Rd., London, S.W. [8785

B.S.A. Combination, 1916, only done 1,200, almost as new, Lucas accessories; £65.—Walton, Turnlee Rd., Glossop. [X8642

B.S.A., 4¼h.p., Model H., late 1917, only been on road once; 60 gns., lowest.—Male, Roselyn, Coalway Rd., Wolverhampton. [X8800

FOR Sale, 1917 B.S.A. motor cycle and sidecar, with hood and wind screen, 4½h.p., used very little.—Apply, C.S., Smiths' Library, Minehead. [8790

B.S.A., 1914, 4¼h.p., 3-speed, kick start, and coachbuilt sidecar, in splendid condition, with all accessories; £55, no offers.—Percy Morgan, Woodlands, Cinderford, Gloucestershire. [X8746

B.S.A., 1913-14, with coachbuilt sidecar, 3½-4h.p., Bosch, 2 speeds, kick, chain drive, lamps; any trial; 33 gns.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [8835

3½h.p. B.S.A. Combination, O.B., 2-speed, clutch, guaranteed perfect order, ready to ride away; owner killed in action; £35.—Grantham, Chorlwood House, Chorlwood, Surrey. (D) [8795

1916 B.S.A. Model K. Combination, large concealed sidecar, P. and H. head lamp, rear lamp, apron, and all accessories; this machine has only been used a little; £63.—Walbro' Cycle Co., Saffron Walden. [X8406

Calthorpe.

CALTHORPE, 1916, T.T., 2-stroke, 2 speeds, electric lighting; £26.—51, Maplethorpe Rd., Thornton Heath. [8851

CALTHORPE-J.A.P., 2¾h.p., 1916 model, Enfield 2-speed, in perfect running order; any trial; £26.—25, Greengate St., Stafford. [X8767

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

CALTHORPE, 2-stroke, 1915, 2-speed, knee-grips, Senspray carburetter, all lamps, good tyres, fine condition, very carefully used; £25.—Mebes and Mebes, 154-6, Gt. Portland St., W.1. [8708

Chater-Lea-Jap.

CHATER-LEA, J.A.P. 8h.p., and sidecar; £45; any trial.—Palmer, 138, Church Rd., Battersea. [8855

Clyno.

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London. [8752

1914 6h.p. Clyno Combination, also spare wheel; price £58, or exchange Henderson and cash adjustment.—Pirie, Cranleigh. [8763

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

Advertising and Publishing Offices:
20, Tudor Street, London, E.C.4.
Telegrams: "Cyclist, Fleet, London."
Telephone: 2848 City (five lines).

Editorial Offices:
Hertford Street, Coventry.
Telegrams: "Motorcycle, Coventry."
Telephone: 10 Coventry (five lines).

Northern Offices:
199, Deansgate, Manchester.
Telegrams: "Iliffe, Manchester."
Telephone: 620 City.

Subscription Rates: Home, 15s. 2d.; all countries abroad, 19s. 6d. per annum.
The Foreign rates quoted above apply also to men in the Services abroad.

Colonial and Foreign Agents:
United States—The International News Agency, New York. Canada—Toronto News Co., Ltd., Toronto; Montreal News Co., Ltd., Montreal; Winnipeg News Co., Winnipeg; British Columbia News Co., Vancouver; Gordon & Gotch, Ltd., 132, Bay Street, Toronto.
Australia—Gordon & Gotch, Ltd., Melbourne (Victoria), Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
New Zealand—Gordon & Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin. India—A. H. Wheeler & Co., Bombay, Allahabad, and Calcutta.
South Africa—Central News Agency, Ltd. Paris—Smith's English Library, 248 Rue Rivoli.

An Old Market—Inflated.

WE wonder whether it has dawned on the trade that peace will restore—and expand—an ancient market for motor bicycles which the industry had previously forfeited? Prior to 1914 we occasionally received enquiries from elderly persons of modest means and aristocratic lineage about motor cycles intended as local runabouts—between house, club, golf links, railway station, and the like. The enquirers generally allowed for a fair price range, but stipulated for (*a*) freedom from vibration, (*b*) easy starting, (*c*) low weight, and (*d*) an entire absence of petty troubles. Needless to say, (*c*) was the only point in which the trade could really fill their specification. For such enquirers, "comfort" implies a first-class saddle, and a frame sprung fore and aft; "easy starting" connotes either a self-starter or certain firing after a 3ft. push, and that without the exercise of trained intelligence over the preliminaries; and the "absence of petty troubles" indicates a lubrication system which will neither soot the plug nor seize the big end if the driver forgets to turn on a tap. We failed to supply a machine of this type. In consequence of our failure thousands of retired soldiers, ex-civil servants, Anglo-Indians, and younger sons either employed taxis or squeezed out the necessary capital and bought light cars. The war will hit these men hard. Their incomes are rigid, and their expenses are fluid—in the wrong direction. They will be driven to swallow their old contempt for the motor cycle, and the first firm who offers them a really sound lightweight at a rational price should do good business.

It is probable that similar reasoning applies to the design of post-war motor cycles in general. In the old days the average motor cyclist prided himself on being a bit of a mechanic. He appreciated, rather than resented, the fact that the exercise of brains was necessary if he was to get the best out of his machine—one might almost have said, to keep it running at all: for after all, many pre-war lubrication systems were so crude that if the driver forgot the lubrication system for fifteen minutes, the engine ran risk of seizure. The increased cost of living is going to force into our ranks many men who regard a mechanic as an essentially vulgar person: who would not dream of repairing punctures with their own hands, and who expect a vehicle to be entirely automatic. They have plenty of brains; and if they cared to employ them, they could get as good results out of the pre-war type of motor cycle as anybody else: but a temperamental antipathy prevents them from trying to comprehend a machine. For them motor cycling is purely utilitarian. They cannot regard it as a hobby, and the trade takes it for granted that motor cycling is *par excellence* a hobby.

In this dilemma the industry can choose between two policies. It can either say to itself, "These potential purchasers must be educated. A mechanic is not essentially vulgar. Wilful helplessness of this character is unpardonable. We will continue to design machines which are not foolproof until these supercilious gentry understand that they must take a technical interest in their mounts!" Or, alternatively, the trade can—if it so wishes—evolve a type of machine which can be driven and maintained by the sort of person who uses a coal hammer on wood screws, and overwinds his watch once every week. It is likely that the latter policy is the more desirable on general grounds, and that automatic carburation, automatic lubrication (minus even a two-way tap), and an interlinked clutch and gear control represent a sound policy. It is, moreover, essential that such a mount as we have in mind should be a really clean machine, that is to say, it should be well mudguarded, and more important still capable of retaining the oil which is put into its crank case.

An index to the advertisements in this issue will be found on the page facing the back cover

THE OLD SPORTING DAYS.

"Shall we have These Days again?" is a Question often asked. If the Opinions of Many Enthusiastic Motor Cyclists are of any Value we shall undoubtedly.

(1) C. Collier, Matchless, on Cowdale. (2) Gastack Beck, A.C.U., 1913. (3) A Rex passing over Plympton Bridge during an Exeter trial. (4) Crossdale Hill, A.C.U. trial, 1913. (5) F. A. Colliver, Indian, on Kop Hill in the Herts M.C.C. hill-climb. (6) Acrobatic feats at a bend on an extremely steep gradient. (7) Rev. P. Bischoff on Rest-and-be-Thankful. (8) G. Lamb, Rex, on Castleton Hill.

The Coming Cycle Car.

THE sergeant who hopes for a four-wheeled cycle car with electric starting, three speeds and reverse, disc wheels, and a 10 h.p. engine at £130, has been too busy Hun strafing to study the pre-war costs of production or the present trend of prices. In 1914 you could not buy such a specification at less than £200. By the time the war ends I doubt whether you will get it at much under £400. We must all reconcile ourselves to a vast increase in prices, coupled in most cases with a substantial decrease in *real* as opposed to nominal *income*. This point needs no labouring. I will not betray personal secrets, but imagining that I was paid 21s. for my weekly page before the war, and get 30s. for it in war time, I am actually worse off, as my 30s. would not buy to-day what 21s. bought in 1914. After the war we shall see all the cheaper strata of the motor trade struggling to reduce the cost of their productions. Motor cycles will be less good or more expensive than they used to be. The problems which have prevented the ideal cycle car from appearing will be intensified, as price is the real crux in this field. On the other hand, cycle cars of some sort are inevitable. Light cars of the old type will be fabulously expensive. There are plenty of people who steadfastly refuse to buy Fords or sidecars, but want a motor. This demand should beget a cycle car of sorts.

Four Alternatives.

BRIEFLY, the cycle car aims at giving all the advantages of a car at a reduced price. The cycle car designer, therefore, possesses four main ways of price-cutting, viz.: (1) To lower the quality all round; (2) to cheapen production by the "mass" system. (Ford's genius lies in the fact that by this method he has produced a pukka car at the price of a cycle car); (3) to simplify the chassis; (4) to simplify the engine, which is the costliest single item of every chassis. Any two or more of these methods can be used in combination. This variety of expedient accounts for the weird variety of cycle cars which have defaced our roads and these pages. Our R.A.F. sergeant, being immersed in more urgent matters, overlooks the lot.

The Most Promising Plan.

THERE is no real future for a car of lower quality than the 1914 light cars—one or two of them touched rock-bottom with an exasperated public. It is questionable whether British home markets are big enough to permit of mass production on a scale sufficient to cut prices appreciably; and in the past we have not chosen to utilise our colonial markets fully. I omit a conceivable fifth avenue, that of cheapening the coachwork and fittings, because no conceivable vehicle could have shoddier coachwork and simpler accessories than our last cycle car boom produced. It remains to choose between simplifying the engine, or the chassis, or both.

Simple Engines.

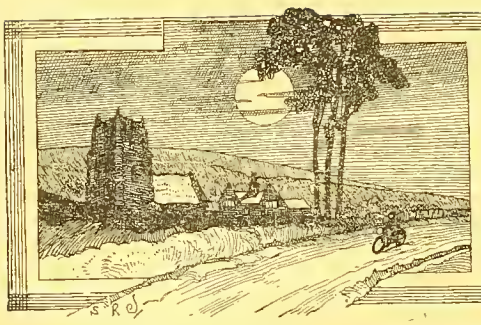
TWO cycle cars in the last batch survived—the 5 h.p. A.C. and the Morgan. The A.C. engine approached the limits of simplicity better than the Morgan. Further progress in this direction is now possible, as aero engines have multiplied our comprehension of air-cooling. I see no reason why my R.A.F. friend should not get his good, powerful, clean 8-10 h.p. engine after the war; but I question whether the cheap cycle car will have it. The costs will be cut too fine. A 10 h.p. means speed; speed means a strong chassis and super-springing. Something like the A.C. single-cylinder engine in a four-wheeled chassis is implied by the situation.

Simple Chassis.

HERE again our correspondent over-rides every vital consideration. He specifies a car chassis *de luxe*. There will be no question of electric lighting, or of gear boxes with three forward speeds and a reverse. The real issue is whether the designers can give the cheap market four wheels. Morgan and Scott—two of the cleverest men catering for us impecunious mortals—say No. If we get the fourth wheel from some brainy optimist, it is unlikely to have more than two forward speeds, and, when we want to turn in a narrow road, we shall have to lift the tail of the car round in penny numbers. It is useless to dream of post-war super-cycle cars at post-war prices. If a car which cost £200 in 1914 is to cost £400 after the war, a cycle car which was once built for £100 will cost £200 after the war. Fancy a Bedelia at £150-£200! Yet that is the sort of atmosphere in which buyers and builders alike must dream their post-war dreams. We may live to see many a motor bicycle retailed at £100, and baby two-strokes commanding the sort of figure which once stood for a complete American 7-9 h.p. twin.

Coming Electrical Equipments.

HERE is our tame electrician's forecast of the post-war electrical specification for motor cycles: (*a*) A dynamo generator, driven by the engine, which will provide the ignition current when the engine is once started, and will furnish a surplus current for keeping the accumulator up to the mark. (*b*) An accumulator which will supply the ignition current for starting the engine; the motive power for setting the engine going, thus eliminating the kick-starter; and the current for the lamps. I suppose a charging dynamo will solve the old problem of attaining accumulator reliability on solo mounts. But I have uneasy dreams of a triple short-circuit in the above outfit on a wet night umpteen miles from home.



A "FLAT FOUR" WITH INTEGRAL GEAR BOX.

A Unique Design combining a Gear Box with an Engine of the Horizontally-opposed Type.

ALTHOUGH the design described below was made originally solely to satisfy my own requirements, it appears to me that it is quite probable that there are a good many whom it would also suit, and that it may therefore be of interest.

After riding various makes of modern machines, ranging from a 2¾ h.p. single-cylinder of about 300 c.c. to a 7 h.p. Indian twin of about 1,000 c.c., I have come to the conclusion that I want the following combination and also that it can be made.

In the first place, I want a machine entirely for solo work and not to take a sidecar. Secondly, it should be lighter than the ordinary 3½ h.p. to 4 h.p. single—in fact, not much heavier than the 2¾ h.p. Douglas. Thirdly, the engine should not have to run at excessively high revs. to give the required power. Fourthly, it should pull quite smoothly at low revolutions. I further want the engine and gear box combined in one unit with as few working parts exposed as possible, and the whole to make a clean design.

A Four-cylinder Engine of Unique Design.

I came to the conclusion that these requirements could best be satisfied by a four-cylinder engine having cylinders about the same size as those of the 2¾ h.p. Douglas — *i.e.*, a four-cylinder of about 700 c.c. capacity. Owing to the small flywheel required for the four-cylinder this should be a good deal lighter than the 3½ h.p. single, while further weight is saved by making it in one unit with the gear box and doing away with the attachments of the latter to the frame, provision for chain adjustment, etc.

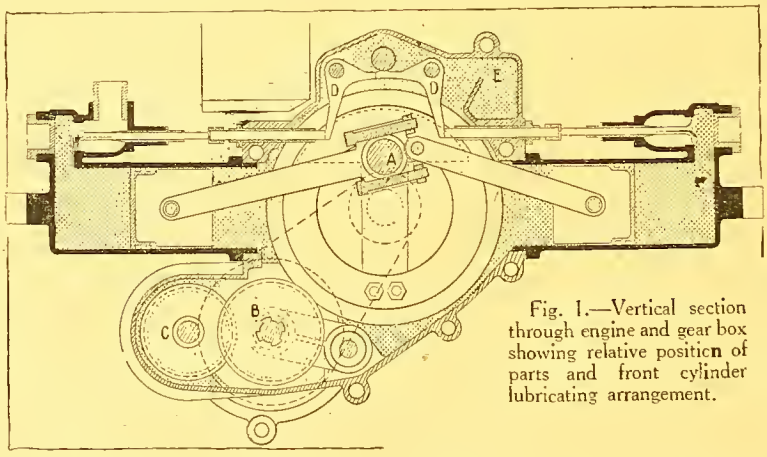


Fig. 1.—Vertical section through engine and gear box showing relative position of parts and front cylinder lubricating arrangement.

There are various ways of putting a four-cylinder engine into a bicycle, but the practical alternatives resolve themselves mainly into two—the vertical and the opposed cylinder assembly. The vertical is the type which has been mainly to the front up to date, but it has certain inconveniences in a cycle which do not appear in a car. In the first place a motor cycle engine is usually air-cooled, and in this case the four-cylinder vertical is at a disadvantage, as either it must be a very long engine which is very inconvenient and adds weight, or else the cylinders must be too close together for good cooling.

Further, the vertical engine practically necessitates gear transmission, and it is not very easy to make a satisfactory arrangement of the gear box, etc., in the space available. The problem is quite different from that in a car, where there is ample room for the clutch and gear box. If the weight of a motor cycle is to be kept low, it is necessary to keep the wheelbase moderate, and in this case the space for the gear box, etc., is very cramped. When comparing the transmission of the motor cycle and car it must be remembered that in the latter a *real* chain drive was never tried on a large scale, and that the contest was not between the chain and the bevel gear, but between a bevel plus chain and a bevel alone. Naturally adding a chain drive to the bevel drive did not increase the efficiency.

In a motor cycle, however, all-chain drive has been made a success, and there seems to me no reason to depart from it.

The arrangement adopted was therefore a four-cylinder opposed engine combined with the usual three-speed gear box, with a chain for the final drive. By building the engine and gear box in one unit a good deal of weight should be saved, and also the whole made more compact so that the machine can be shortened. The frame can be lightened, as it does not have to provide for keeping the engine and gear box rigidly in line, and also eliminates the need for means of adjusting the front chain. With the combined unit the chain is very short, and is entirely enclosed and thoroughly lubricated. Judging from lorry experience, an adjustment is quite unnecessary, as the chain will run a very long time without attention, and in any case is not very expensive to renew. I have arranged the flywheel inside, as this makes a much neater and cleaner design than the outside flywheel, and it can be placed in the middle

A "Flat Four" with Integral Gear Box.—

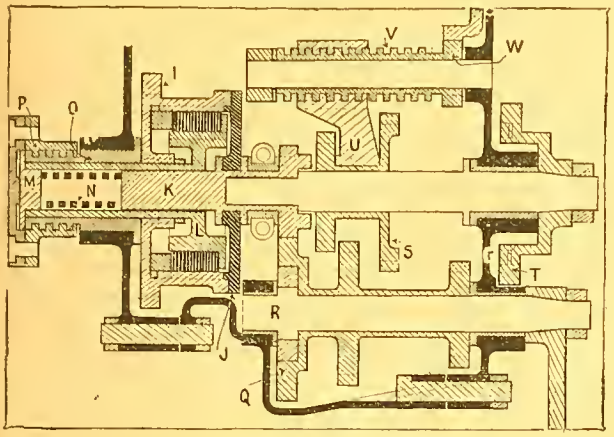


Fig. 2.—Clutch and gear box assembly.

of the crankshaft instead of at one end. By this arrangement both the main bearings can be made solid-ended, and therefore no oil can leak out of them.

The general arrangements of the design of the power unit are shown in figs. 1 to 5. I have not got out a detail design of the cycle itself, as this is essentially a cycle maker's job, but the unit would make up into a machine somewhat as fig. 5.

The four cylinders are 2¼in. by 2¾in. (57 mm. × 70 mm.), giving a total capacity of 720 c.c. They are placed in pairs on opposite sides of the two-throw crankshaft. This arrangement does not allow of the engine being perfectly balanced theoretically, as there is a slight rocking moment or couple, but as the cylinder centres are not very far apart, the amount of this is very small, and the vibration due to this would probably be less than that of the vertical four-cylinder. I preferred putting up with this slight want of theoretical balance to having a four-throw crankshaft which would entail making the engine wider and heavier and the crankshaft less rigid.

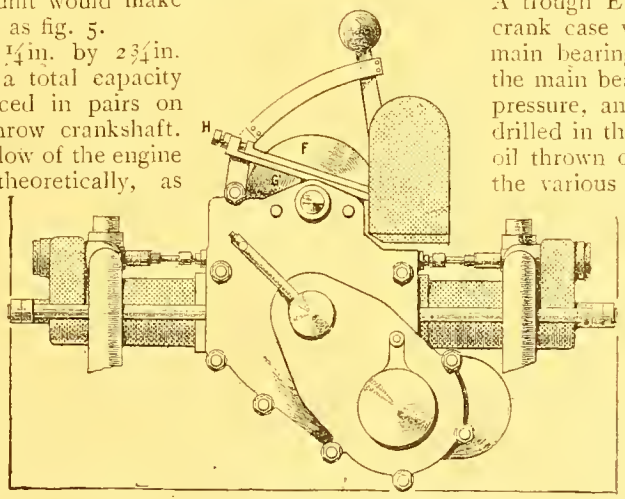


Fig. 3.—General external near-side view of unit.

The crankshaft is carried in unsplit close-ended bearings at each end, and has the flywheel flanges bolted on to the middle web between the cranks. Inside each of these bearings is fixed a chain wheel, the one on the left-hand side driving the change speed gear and that on the right-hand the camshaft and magneto. These two chain wheels are interchangeable. By this system the crank case, which also contains the change speed gear, can be made in three pieces only, making for lightness and cheapness.

The drive is from the crankshaft to the mainshaft of the gear box, which is placed below and behind the crankshaft, but as close to it as possible, so that the chain is very short. The layshaft is again behind the mainshaft.

Fig. 1 shows the unit on a vertical section through the right-hand pair of cylinders, and fig. 2 a vertical section through the clutch and gear box unit. Fig. 3 shows the elevation of the left hand side of the unit. Fig. 4 is a plan, the forward half in section, part through the cylinder centre, part through the valve centre, and fig. 5 shows a suggested assembly on the machine.

In these drawings the cooling ribs on the cylinders are not shown, but would be conventional. In fact, many parts are not shown properly in detail owing to lack of time and drawing facilities. Coming to the details in fig. 1, A is the crankshaft, B the main shaft of the gear box, C the layshaft. The arrangement of the cylinders, valves, and connecting rods are clearly shown and have no special features. The valves are driven by bell crank levers D in order to admit of their being placed parallel with the cylinders and also to allow the camshaft to clear the flywheel.

Lubrication.

For the lubrication of the opposed engine to be satisfactory it appears to me that much the best plan is to introduce the oil to the big ends through the crankshaft, as this ensures the front and back cylinders getting an even amount of oil. This could be arranged by having forced lubrication as in a car, but I have tried to get the same effect more simply. A trough E is formed at the top of the crank case with leads to the ends of the main bearing drilled in the case. Thus the main bearings are always under slight pressure, and the oil flows through holes drilled in the shaft to the big ends. The oil thrown out of the big ends lubricates the various working parts, including the change speed gears. The lowest part of the crank case is the well in which the driving chain runs, and the crank case is so formed that the oil is thrown by the chain back into the trough E. If this system did not work, of course, proper forced lubrication could be provided. An advantage of this system is that there is no loss of power in churning the gear box oil. In cars this loss is considerable.

The camshaft and magneto are driven by a single chain, which is adjusted by sliding the whole of the cover F along the flange G by an adjusting screw H (see fig. 3). The magneto is carried on a bracket cast on this cover, so it always remains in line with the driving chain wheel spindle.

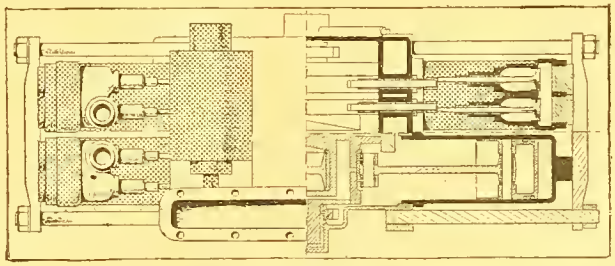


Fig. 4.—Part sectional plan of engine unit showing layout of four-cylinder.

A "Flat Four" with Integral Gear Box.—

The valves do not look very large, but the gas velocity through the lip is a good deal lower than that of some of the most effective machines.

Coming now to the transmission (fig. 2), I is the chain wheel driven from the engine and is formed in one piece with the female part of a multi-disc metal clutch. This piece has a disc J in two halves fixed to it by screws, and this runs on the shaft K, forming part of the constant mesh pinion, so steadying the outer end of the clutch casing and also locating it longitudinally. At the end of the male part of the clutch L is a disc M secured to it. N is the clutch spring. The external bearing O has a 45° thread cut on the outside of it along which the part P slides when it is revolved by the clutch lever. In the position shown the clutch is out and the disc M is being pressed against the end of the bearing O, and acts as a clutch stop. If the clutch be released the spring presses M outwards, carrying L with it, and the latter compresses the clutch discs and transmits the drive. Q is the constant mesh wheel of the layshaft, and has inside it a free wheel clutch connecting it to the shaft R, which forms the spindle on which the layshaft runs. This shaft has the crank of the kick starter on the end of it, the latter revolving Q by the action of the free wheel clutch and driving the engine through the constant speed wheels and chain in the usual way. This gives a ratio between the kick start and the engine of four to one, which should be enough for a four-cylinder engine. No half-compression is provided, as with this type of engine it should not be necessary. S is the sliding gear, and T the chain wheel of the final drive. Gear is changed by a fork combined with a sliding part U, which has a 45° thread cut inside it, and is slid along by rotating the male part of the thread V. This is effected by rotating the pinion W by a quadrant geared into it and worked by an arm on the spindle of the change speed lever.

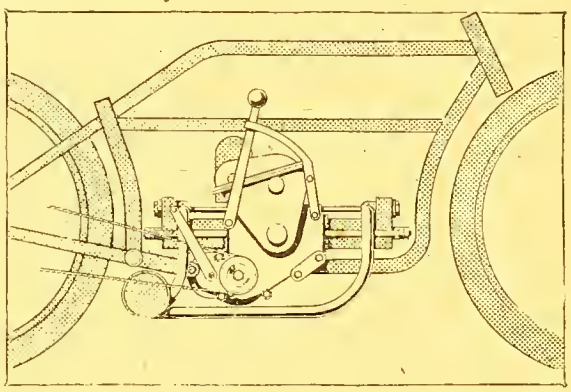


Fig. 5.—Showing compact arrangement of unit in frame.

Plain bearings are shown; these are, however, not an integral part of the design, but were put in to save drawing.

While there are several points in the design which might very easily be improved, it appears that it might be worked out into one with many advantages. It is one which has all the working parts, valves, magneto, etc., well out of the mud, yet has a low centre of gravity and good ground clearance. It also has practically no working parts exposed, such as the connections of the change-speed gear, and, as only two working spindles come through the crank case, very little oil should leak out, and what does leak out through the chain wheel spindle is used to lubricate the chain through a groove made to catch it. As all the change-speed connections are carried on the unit the change-speed cannot get out of adjustment through the frame straining, yet the lever is in quite a convenient place, which is not always the case when carried on the usual separate gear box.

Finally, the whole is compact for a unit of this cylinder capacity, and can, if desired, be built into a machine with a wheelbase of only 53in. It should be a good deal lighter than two separate units—in fact, I do not see why it should be materially heavier than the 350 lb. 2¾ h.p. twin with the separate gear box and necessary connections to frame, etc.

It should, on the whole, also be a cheap unit to build for much the same reason, namely, that it is one unit which is a bench job, and needs very much less erecting on the frame than the two separate units.

This is the first attempt I have made to produce a design for a motor bicycle engine, and I can see many possible improvements. I have started on another one in which the main driving chain is placed *outside* the main bearing in place of inside, and the clutch is of the conventional pattern, the chain running in a separate casing outside the crank case, but this may never be finished. F. STRICKLAND.

PETROL ECONOMY.

WE recently overheard a discussion between interested motorists concerning the consumption of petrol for testing aeroplane engines. A factory in England was reputed to be delivering 150 engines of 240 h.p. each per week. These engines were supposed to be tested for twenty-four hours continuous running on the test bench, and to consume in that time 32,000 gallons of motor spirit. One of the party suggested that the Government might save a considerable quantity of petrol if they were to use coal gas, to which suggestion the reply followed that it would take all the available coal gas supply of a large town to replace the petrol. Based on the assumption that 250 cubic feet of gas equal one gallon of petrol, the gas consumption would be eight million cubic feet. The available gas supply of the town in question is about fifty million cubic feet, so that there would still be a fair proportion of coal gas left for ordinary requirements of lighting, etc. That, however, is not the question, and we publish the paragraph as showing the enormous petrol consumption at one factory alone to render it clear to motor cyclists who do not know even now that there is urgent necessity for economy in motor spirit. Also, if fifty million cubic feet of gas do represent the available supply of the gas company in question, their customers' requirements, combined with those of the Government, are in all probability taking every foot of gas that can be made

THE STEAM CYCLE.

A Design for a 4 h.p. Steam Cycle having Fuel Capacity for a Hundred Miles Journey.

A problem of continual interest to engineers is the design of a really reliable, compact, and efficient steam cycle of pleasing outline. The following article indicates that the problem of the steam cycle is receiving attention, and has better possibilities than is generally recognised.

WHEN we look back at the early designs of motor cycles, say of sixteen years ago, and compare them with those of to-day, we wonder how we ever prided ourselves on the possession of such unsymmetrical machines. The steam cycle is in the same manner undergoing an embryonic period, and designers, conscious of the rivalry they will have to face to prove their product superior to the modern petrol-engined cycle, are striving to present at the end of the war a worthy competitor for public favour with all the advantages and none of the disadvantages of the motor cycle as we know it to-day.

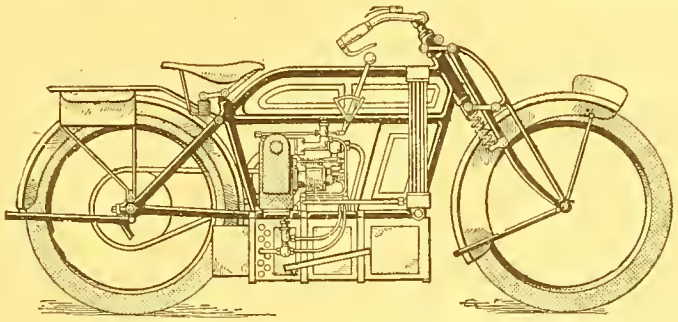


Fig. 3.—General arrangement of the steam cycle described on this page.

The likelihood of their succeeding is evidenced by the drawings and details that we are able to publish by the courtesy of the designer, Mr. T. Hindle, and *The Model Engineer*. There are no revolutionary principles involved, the main problem being to get a compact assembly in the standard motor cycle frame.

The boiler is of the "flash" type, which provides lightness, rapidity of action, safety under all conditions, and simplicity of construction. This particular boiler consists of about 80ft. of solid drawn steel tubing arranged in three concentric coils—the outer ones acting as feed water heaters. The intermediate coil acts as a super-heater. The whole makes a very compact assembly with the burner, the outside measurement being 1ft. 10in. × 8in. × 8in. The fuel (paraffin) supply tank is placed in front of the engine, and contains a small cylindrical pressure tank which is fed by a fuel pump on the engine. This enables the main tank to be replenished without extinguishing the burner. The tank placed in the usual position is for water, and a small portion of the rear end is retained for lubricating oil. The capacities are arranged to give a run of about 100 miles.

The engine has two cylinders of 38 mm. bore, and a two-throw 180° crankshaft which gives a stroke of 44.5 mm. The working pressure is 500 lb. per square inch, and the valves are of the ordinary poppet type, the exhaust valves being in the overhead position.

A steam condenser is provided in the position usually occupied by the radiator on water-cooled petrol machines. The power expected would be at least 4 b.h.p.

As regards starting up from cold, this will occupy about four minutes, and much less when warm. Means are provided by which the burner is regulated automatically or by hand if desired. A comparison of the controls with those of a petrol motor cycle will be interesting. Of course, a gear box is unnecessary.

Petrol Controls.	*Steam Controls.*
Throttle. Air.	Water by-pass. Burner.
Magneto. Clutch.	Throttle. Variable cut-off.
Gears. Exhaust.	Pressure relief valve.

The steam throttle is only used for starting and stopping.

Comparatively, therefore, the steam cycle shows up favourably as regards weight, bulk, ease of control, economy, and speed. The torque should be equal to that of a four-cylinder four-stroke petrol engine. Chain drive is proposed, and this should prove most efficient, no shock absorber being necessary.

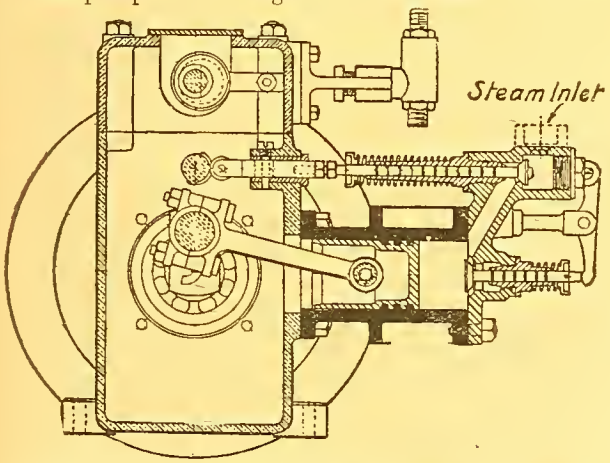


Fig. 1.—Vertical section, showing valve system, and fuel pump with driving eccentric.

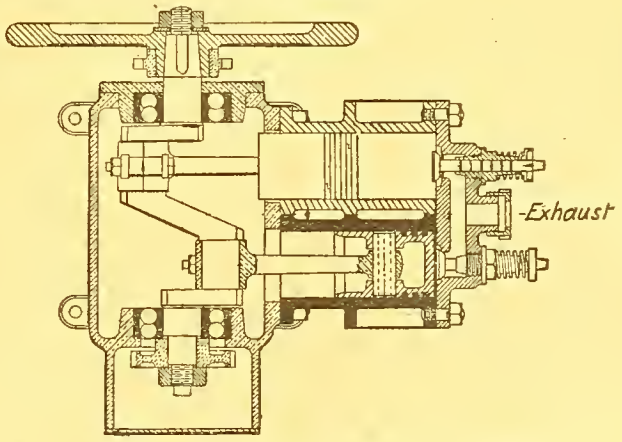


Fig. 2.—Horizontal section, showing flywheel and crankshaft assembly and the detachable cylinder head.

CURRENT CHAT

SPECIAL FEATURES

A "FLAT FOUR" WITH INTEGRAL GEAR BOX.
A STEAM CYCLE. MY IDEAL MOTOR CYCLE.

TIME TO LIGHT LAMPS

GREENWICH TIME.

Oct. 24th	... ...	5.18 p.m.
,, 26th	... ...	5.14 ,,
,, 28th	... ...	5.11 ,,
,, 30th	... ...	5.7 ,,

Home-produced Fuel.

The first systematic operation in the search for crude oil was initiated on the fifteenth of this month by the commencement of boring operations in Derbyshire. It is expected that oil will be found at a depth of 2,000 to 4,000 feet.

Petrol "Vapours."

A motor cyclist who was fined at Coventry for using motor spirit in contravention of the Petrol Restriction Order pleaded that he was making use of the petrol for fear of what he had in stock evaporating during the winter.

What Next?

A correspondent asks, "Will you kindly advise me of the highest speed ever attained by the ordinary pattern tank and also by a whippet?" As we have no official records of any tank race meet or the Berlin Stakes, perhaps some reader could oblige.

Control of Rubber Industry.

The *Board of Trade Journal* says that the Minister of Munitions has appointed a committee, under the chairmanship of Sir Clarendon Hyde, to advise him as to the control of rubber, and that it may become necessary to fix maximum prices for transactions in rubber. The Minister may be compelled to make Orders rendering inoperative any forward contracts or transactions entered into after the publication of the notice.

The Industrial Reconstruction Council.

A conference on "Women in Industry" will be held, under the auspices of the Industrial Reconstruction Council, on Tuesday, November 5th, at 6 p.m., in the Hall of the Institute of Journalists, 2 and 4, Tudor Street, E.C.4. The subject will be introduced by Miss Lilian Dawson, secretary of the Fabian Society Women's Group and a member of the National Union of Women Workers, after which the discussion will be open. No tickets are necessary.

Some Grinding.

The following recently occurred in a translation of an official report: "The gearing has been corrected by means of a grindstone. It is, however, very heavy." Which reminds one of the cycle repairer who, when asked by a motor cyclist to grind in his valves, replied that he was sorry, but he could not do the job, as he had broken his grindstone!

Both the above, though strange, are perfectly true.

Imports and Exports.

The imports and exports of motor cycles and parts for the month of September show a slight increase on the former and a big decrease on the latter compared with the same month last year. The figures are here given:

IMPORTS FOR SEPTEMBER.

	1918		1917
Parts only	£2,421	--	£1,144

EXPORTS FOR SEPTEMBER.

	1918		1917
Machines	£9,323	—	£56,721
Parts	£18,092	—	£22,285
Total	£27,415	—	£79,006

A German despatch rider equipped with gas mask carrying what looks like the barrel of a machine gun.

Alcohol.

Mr. Walter Long has appointed a committee to investigate the available sources of supply of alcohol, with particular reference to its manufacture from materials other than those which can be used for food purposes, the method and cost of such manufacture and the manner in which alcohol should be used for power purposes. Sir Boverton Redwood will act as chairman.

Motor Volunteers Wanted.

There are vacancies on the strength of the Middlesex A.S.C. Mechanical Transport Volunteers, Central Group, and application to enrol should be made to Capt. R. H. Regnart, 406, Euston Road, London, N.W.1.

Recently the Volunteer Motor Transport Corps were of considerable service in assisting one of the Government Departments in connection with the threatened railway strike, and the force, as organised, stands ready for each and every emergency.

British Magnetos.

The display arranged by the British Ignition Apparatus Association at the exhibition of New British and Key Industries now open at the Central Hall, Westminster, is exceedingly interesting as showing the developments effected by British magneto makers.

The exhibit includes a complete range of magnetos for every purpose, made by the British L.M. Ericcson Co., Ltd.; the British Thomson-Houston Co., Ltd.; E.I.C. Magnetos, Ltd.; the M-L Magneto Syndicate, Ltd.; North and Sons, Ltd.; Thomson-Bennett Magnetos, Ltd.; and C. A. Vandervell and Co., Ltd.

A Joint Roads Committee.

A committee has been appointed for the purpose of carrying into effect the powers possessed by the Army Council with regard to the control and maintenance of public roads, and of performing certain duties in connection with the construction, improvement, and maintenance of roads for war purposes.

Fashion and Ingenuity.

Latterly we have noticed several young women, who, though not in a position to afford one of those devastatingly smart trench coats, have made the best of a bad job by borrowing their absent brother's motor cycling belt and strapping it tightly over the old "mac."

DON'T FEEL SORRY FOR A DISABLED MAN—EMPLOY HIM

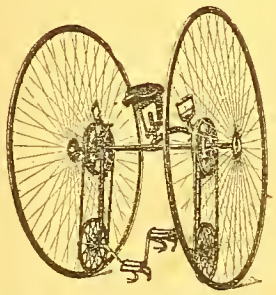
1854 1918

From the Days of the Crimea

SOME EPISODES IN

B.S.A. HISTORY.

AN EARLY B.S.A. PRODUCTION



The "Otto" Bicycle made in 1880 by The B.S.A. Company.

ONE of the first bicycles manufactured in quantities by The Birmingham Small Arms Company was the "Otto" Safety Bicycle. Instead of one wheel behind the other as is usual in the modern cycle, this curious old mount had its wheels side by side, and it was no easy matter to achieve the balance necessary before comfortable riding could be obtained. From those early times the B.S.A. Company has been closely associated with cycle construction, and riders of B.S.A. Bicycles and Motor Bicycles are to-day enjoying the results of knowledge gained through years of research and practical experience.

THE BIRMINGHAM SMALL ARMS COMPANY LIMITED.
BIRMINGHAM.

The Fables of Fame

A certain king took wondrous pride in the feats performed by a team of expert runners, whom he kept for the amusement and service of his guests.

One day a strange youth sought audience of this monarch. "My lord," said he, "I can run faster than any member of your team, and to show you I am strong as well as fleet of foot, I'll carry on my shoulder any servant whom you name."

The king commanded that a test should be arranged forthwith. The youth fulfilled all that he claimed, and, being summoned to appear before the ruler once again, explained that, though small of stature, his speed was due to power which he'd developed in his muscles, and his ability to carry heavy loads to constant study of how to distribute weight most evenly. The

CLYNO

THE Sidecar Motor Cycle

has the speed which power alone can give, and is able to carry two passengers successfully because the weight of its sidecar is evenly distributed and puts no strain in places where a strain ought not to be. In short, the cycle and the sidecar are built *together as one unit.*

Here is the Clyno Post-war Policy—

Mass Production of One Model (8 h.p.).
Competitive Prices of both Outfit and Spares.
And Strictly Rotational After-war Deliveries.

THE CLYNO ENGINEERING CO.,
Pelham Street, WOLVERHAMPTON

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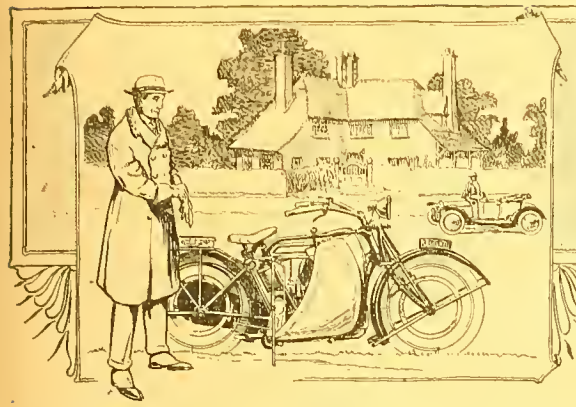


My Ideal Motorcycle

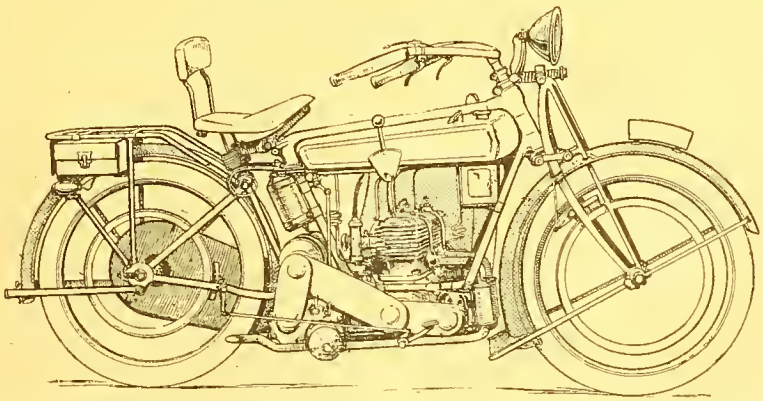
A Doctor's Opinion of the Features of Design that will Appeal to the Medical Man.

IT is safe to say that at the present time there is no motor bicycle on the market which fully meets all the requirements of a doctor carrying on general practice. There are plenty of machines that are quite satisfactory for summer use and for emergencies at night, etc., but none that will take a doctor clean and fresh to his patient on an average winter's day. The decrease in the standard of luxury which is bound to occur after the war should create a very large opening for a suitable machine to be used in place of a light car.

As a doctor with practical experience of what is required the writer would enumerate the following points in order of importance to which attention should be paid by the designer of a doctor's motor bicycle:

(1.) *Cleanliness.*—Until a machine is introduced which does not necessitate any special dress, and will get the rider to his destination with spotless boots and trousers on a muddy winter's day, motor cycling will never become popular with doctors as a means of locomotion. The writer hopes to show that such cleanliness is by no means impossible.

(2.) *Easy Starting.*—Even when, by present-day standards, a machine is said to start very easily, the aggregate labour of starting it thirty or forty times a day is by no means inconsiderable, and when this is added to the other work a doctor has to do it may well prove excessive for many men. The extreme importance of this desideratum, therefore, will be apparent.



The ideal machine as specified by the writer of the accompanying article. It follows very closely the design of the new Allon twin two-stroke.

(3.) *Silence.*—Many doctors are afraid to purchase a motor bicycle on account of the popular prejudice against its noise which still exists in the minds of some old people; the same old people being very frequently the doctor's best patients.

(4.) *Comfort.*—Covering long distances every day is unquestionably very tiring on the ordinary unsprung machine. The nervous strain to anyone doing simultaneous mental work is particularly severe.

(5.) *Light Weight.*—A doctor's work frequently involves turning the machine round in narrow lanes and other awkward places where it may be impossible to ride. In such circumstances a heavy machine is a great nuisance.

To enumerate the objects to be aimed at in designing the bicycle is easy enough, but to achieve them in practice is another story. Still, here is the writer's idea of what a doctor's machine should be like.

ENGINE.—The engine should be a two-cylinder vertical two-stroke of about 4 h.p., the cylinders firing, of course, at equal intervals. Such an engine would be nearly as well balanced as a four-cylinder four-stroke, while the torque would be exactly the same. The engine should have an outside flywheel and be situated well forward in the frame.

TRANSMISSION.—All chain enclosed drive through a countershaft three-speed gear and clutch. Many so-called enclosed drives are not properly encased, and I would lay particular stress on the chain cases being absolutely oil and grease tight. I am quite convinced that a chain drive is the only thing for all weather work when the driver has to keep clean. Six inches of snow is quite sufficient to put a belt drive out of commission.

IGNITION, ETC.—Dynamo and accumulator, the set being arranged so as to give electric lighting and self-starting. There is no need to labour the advantages of electric lighting when the lamps may have to be used every day for six months in the winter. The self-starter obviates that abomination the kick-starter, and its advantages would be very marked when pushing off was difficult; for instance, when starting uphill in the snow. The dynamo should be situated just behind the cylinders and driven by an enclosed chain from the opposite side

My Ideal Motor Cycle.—

of the engine to the main transmission. The engine being situated well forward in the frame would leave plenty of room for the accumulators just in front of the down tube under the tank.

CARBURETTER.—This should be situated in front of the cylinders and just behind the front down tube

EXHAUST.—In a two-stroke it is necessary to keep the exhausts from the two cylinders separate for some distance. The exhausts should therefore be led by separate pipes to two separate cylindrical silencers arranged vertically in front of the engine. From these silencers separate pipes should conduct the exhaust back under the engine to a large common silencer hung from the frame just in front of the rear wheel, or as near this position as is possible consistent with the springing design. Where each exhaust pipe enters the common silencer an inclined baffle plate should be situated so as to give the gases a revolving motion. From the common silencer a final exhaust pipe should run backwards a little way.

LUBRICATION.—Some kind of forced feed is obviously the ideal, but whatever method is adopted the essential thing is that its operation should be quite independent of any action on the part of the rider.

Details that Count.

FRAME.—This must be properly sprung both fore and aft. My own idea is that for lightness and cheapness of manufacture there is nothing to equal the ordinary helical spring. I can see no essential reason why a spring frame machine should be heavier than a rigid frame. Theoretically the decreased stress to the machine generally should enable the weight of the sprung parts to be reduced sufficiently to balance the weight of the springs, etc.

WHEELS.—Front and back wheels should be interchangeable, and should have belt rims for the brakes to act on. A spare wheel should be provided, not necessarily to be carried, but so that it can be put in while a punctured tyre is sent to the garage to be repaired.

SADDLE.—A movable backrest should be fitted to the saddle. The unpopularity of the backrest at the present time is largely due to the fact that it is uncomfortable if the machine vibrates much.

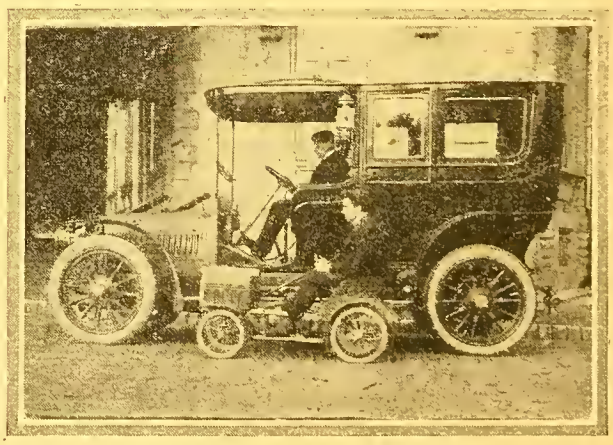
CONTROLS.—The foot brake should act on the inside of the rear belt rim; it should be operable by means of a pedal on each side of the machine, so that either foot can be used as desired. This is very important when a sudden stop may involve the possibility of a skid in one particular direction. The hand controls should be by twisting handle, and a particular point in my design is that these handles should be at least a foot long, so that for ordinary riding the rider could sit up straight or lean back against the backrest while holding the rear end of the handles, but on a slippery road he could drop forward and hold the front end of the handles in a semi-T.T. position. The right handle should control the throttle and the left the spark advance. The release valve should be worked by a lever under the right handle, while on the handle-bar on the right side would be an ordinary Bowden wire lever for controlling the air inlet. On the left side under the handle would be the brake lever operating a brake acting on the inside of the front wheel brake rim. To the outer side of this handle would be another handle for operating the clutch. The gate change speed gear lever and self-starter switch should be situated on top of the tank.

MUDGUARDS.—Ordinary broad mudguards, such as those fitted to the W.D. Triumphs, should be used, and preferably should be unsprung so as to move with the wheels. In addition to these a really efficient mudshield should be fitted. Mudshields have failed in the past largely because they have not been made as an integral part of the original design of the machine. My ideal mudshield would consist of two separate pieces, one for each side, and each piece would be made solid with the footboard of the same side. The mudshields should be constructed so as to project vertically upwards from the front and inner sides of the footboards, and would reach as high as the top of the tank. The combined mudshield and footboard should be fastened to the machine by four bolts, two at the bottom through the footboard and two at the top connecting the mudshield to the top tube of the machine. With a fairly broad tank there would be plenty of draught between the mudshields for cooling the engine. By suitably inclining the front surfaces of the mudshields so as to slope backwards and inwards the amount of draught could be considerably increased if desired. To the top of the mudshields, and continuous across the top of the tank, a waterproof apron could be attached. The top of this would clip on to the rider's coat when in use, and when out of use the apron would roll up on a spring roller.

STAND.—In addition to the ordinary front and rear wheel stands, a folding prop should be provided on the left side so that the machine could be left on a soft or sloping road without fear of it toppling over.

So much for my ideal. How much of it is possible is for others with greater knowledge to say. Doubtless to begin with many of the points I have described would have to be modified or omitted. Nevertheless I am convinced that some such machine will eventually materialise, and, if so, the manufacturer who gets there first will benefit accordingly.

In order to make my ideal complete, I should say that I should *like* the machine not to weigh more than 200 lb., nor to cost more than £75. K.



DIGNITY AND IMPUDENCE

A miniature cycle car built by Mr. Georges Funck, the consulting engineer, during his college days. The engine was a 3 h.p. Minerva, and the transmission was by flat belts, giving two ratios The wheelbase was 3ft. and the track 1ft. 6in.

THE MOTOR CYCLE AVIATION SECTION

History of the Aeroplane.

History of the Aeroplane.

Mr. Barry Pain is doing the scenario of a film history of the aeroplane.

Airman's Seventy-one Victories.

Lt. Fonck, the French airman, has now to his credit seventy-one officially-recorded victories.

America's "Work or Fight" Regulation.

Approximately 100,000 men of military age in the United States have changed over from non-productive to productive occupations since the "work or fight" regulation was promulgated.

A Record Month's Bombing.

During the past three months the R.A.F. Independent Force has made 249 raids on Germany. Last month it dropped the record total of 178¾ tons of bombs, the figures for the previous three months being: June, 66 tons; July, 81 tons; August, 100 tons.

The railways at Thionville, Metz Sablon, and Mezières, Rombach blast furnaces, and Frescaty aerodrome, have been attacked at night without the loss of any of our machines.

350 Aeroplanes Smash German Counter-attack.

Reuter's correspondent, describing a German counter-attack in the Verdun region, says: "When it was reported that the enemy were massing, word was instantly sent which lifted 350 aeroplanes into the air and despatched them with 32 tons of bombs. There were 200 bombers, with 100 chaser planes and 50 triplanes, and they afforded an extraordinarily beautiful spectacle as covering the entire sky in groups of nine or a dozen in V-shaped formation. The counter-attack melted away under their ministrations.

A Peep into the Future.

Famous Airman's Death.

A Berlin telegram says the famous French airman Garros was shot down and killed on the German side of the lines on October 4th.

H. G. Wells and the R.A.F.

H. G. Wells is always interesting, but sometimes he offends. In his latest book he would tell the reading world that "the flying boys" are too fond of wine, women, and song, and that they go up "squiffy," as he puts it. This is difficult to credit.

A Peep into the Future.

In regard to flights to and from England and America, Mr. J. A. Whitehead, of Whitehead Aircraft, Ltd., takes a daring gaze into the future by hinting at the creation of flexible floating aero stations on the Atlantic Ocean. These harbours for aircraft would be kept in position under their own power.

Climbing Speeds.

In the military competition of 1912 the climbing speeds of all the competitors were below 400 feet per minute. The Avro of that date could only climb at the rate of 105 feet per minute, the percentage of total horse-power employed in climbing being 8.6, against 50 employed by an R.A.F. scout of more modern times, the rate of climb being 900 feet per minute at 65 miles per hour.

Honour for A.M.'s.

Honour for Airmen Mechanics.

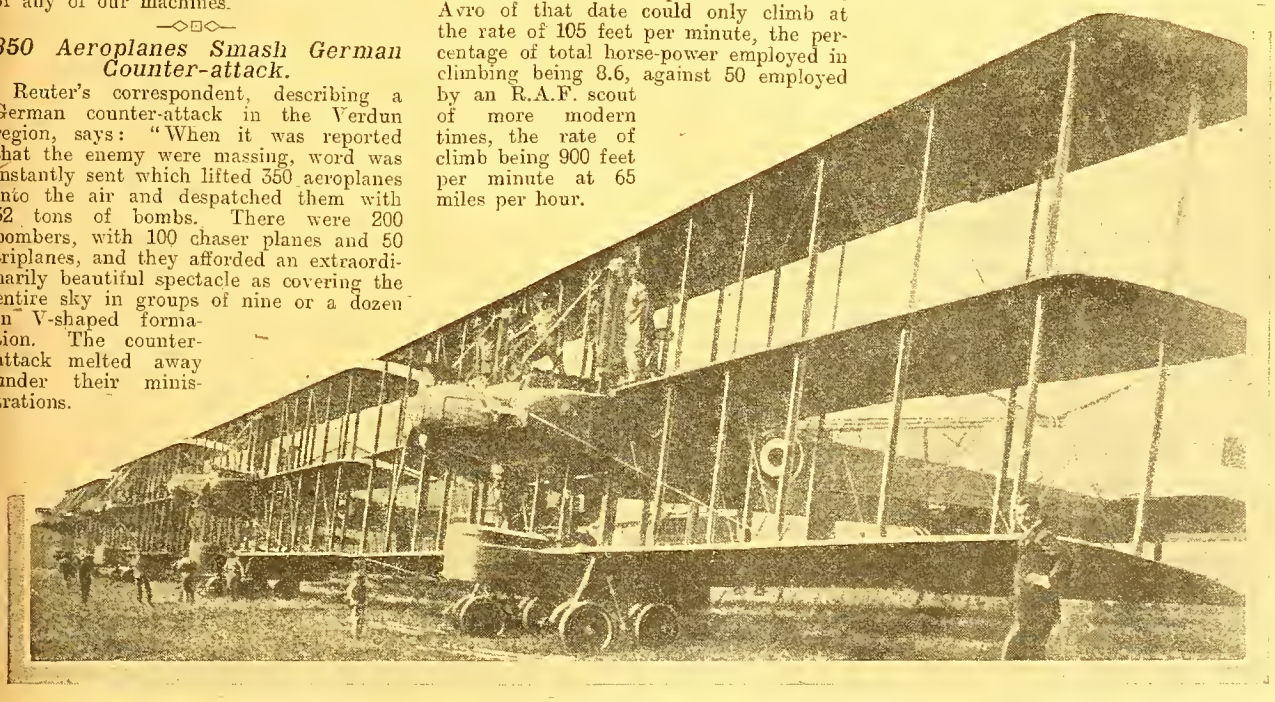
Chief Mechanic Baxter and Sgt.-Mechanic Smith have been awarded the Military Medal. Sgt. Smith also holds the Order of St. Leopold and the Croix de Guerre.

R.A.F. Wings.

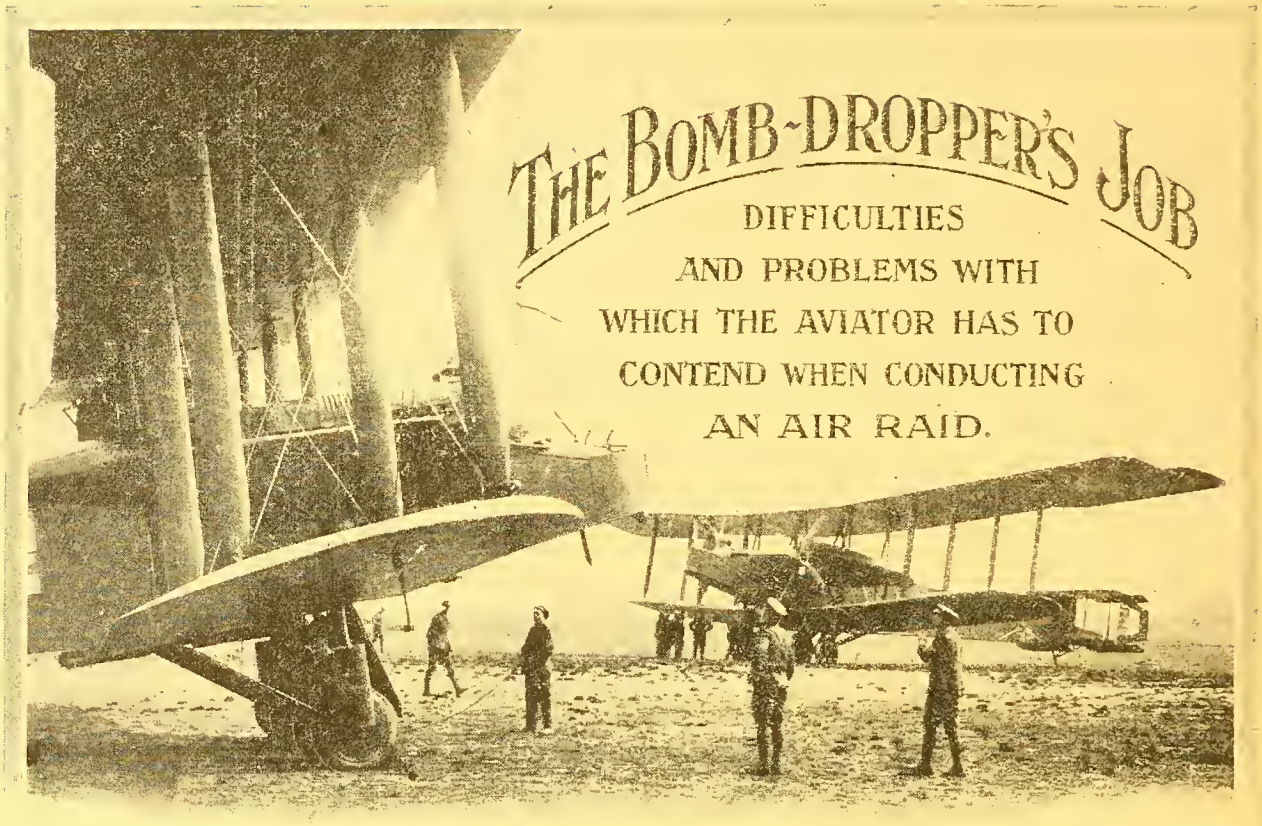
A new Army Council Instruction intimates that pilots' and observers' "wings" are now badges peculiar to the Royal Air Force, and are worn by Army officers only when serving with the Royal Air Force.

New German Aeroplane Bombs.

During the past few days (says the *Petit Parisien*) German airmen have been dropping incendiary bombs of a new type, called "election bombs." They are very light, have considerable incendiary power, and each aeroplane can carry 200. The use of water only increases the fires the bombs cause, and the only means of checking the flames is to isolate the locality where the chemical substances drop. The nature of the substance employed is already known, and it will doubtless not be long before effective means of combating it are found.



A squadron of the famous Caproni triplanes which have been doing such wonderful work in bombing the German and Austrian positions for over a year.



THE BOMB-DROPPER'S JOB

DIFFICULTIES AND PROBLEMS WITH WHICH THE AVIATOR HAS TO CONTEND WHEN CONDUCTING AN AIR RAID.

"TWENTY-FOUR and a half tons of bombs in all were dropped during the night." The callous newspaper reader assimilates such a report very casually, as he munches his breakfast, little realising the extreme technical skill which bomb-dropping demands. Omitting the brains and labour which produce the giant aeroplane, its intricate instruments, and its lethal cargo, we will try to realise how the crew put the finishing touches to the work which has made a night raid possible. The pilot's difficulties may be sub-divided as follow: (1.) Reaching his objective, *i.e.*, navigation. (2.) Eluding or beating off enemy attacks. (3.) Identifying his target, *e.g.*, a munition factory. (4.) Hitting the target with his bombs.

(1.) Navigation.

The problems of aerial navigation by night are as yet unsolved and insoluble on any wide scale. We need only recall the fantastic reports of the Zeppelin commanders in the earlier part of the war. These reports often contained errors of 100 miles or so. Bombs which exploded harmlessly in rural areas were described as having destroyed docks in quite another district. These reports were probably sincere for the most part, and, in conjunction with the fact that a big airship is steadier than an aeroplane and can mount better instruments, they illustrate the supreme difficulties of aerial navigation by night. Precise navigation is possible under two conditions—the night must be clear, and the route must be traceable by means of unmistakable waterways. In peace time continuous vigilance, assisted by lighted towns and special "sky-scraper" lighthouses would atone for the absence of waterways. In wartime, when guiding lights are forbidden in enemy territory, navigation is appallingly difficult except when coast or riverside towns are attacked in bright moonlight. Study of the map of Southern Germany will show that General Trenchard's pilots enjoy very little assistance of this kind. Their unquestionable success indicates that the expert night bomber is beginning to surmount some of the chief obstacles.

(2.) Beating off Enemy Attacks.

Anti-aircraft defence is comparatively helpless on a really dark or cloudy night. Mats of low-lying haze blanket the most powerful searchlights. The defending aeroplane cannot easily locate a raider, or keep in touch with it when sighted. On a clear night the silhouette of a big bomber may be caught and held by a keen pair of eyes against the faint radiance of a starlit sky. Ground observers may pick up the raider's approximate positions by the noise of the exhaust or with the aid of searchlights. The flame of the naked exhaust is visible at a certain distance. Clearly, the night which is best suited for attack is also ideal for defence. Up-to-date searchlights and shrapnel barrages are the bomb-dropper's worst terrors, though a terrier scout hanging on his tail in bright moonlight is most unwelcome. But let the reader imagine what he would feel and do if well held by four or five searchlights and surrounded by bursting shells! Yet every crack bombing pilot is familiar

The Bomb-dropper's Job.—

with the experience, and wriggles away from his enemies more often than not.

(3.) Identifying the Target.

Some while ago the R.F.C. published a half-crown brochure of photographs illustrating its work, including an aerial snap of the Trafalgar Square district. If a reader who knows London studies this snap, taken from a modest altitude in brilliant sunshine, he will not find it too easy to identify particular buildings. He will thus be in a position to imagine what a job it is to pick up a given building in a huge foreign town from 10,000ft. on a dark night. Let him remember that while the crew are peering about for the railway junction or the powder factory, as the case may be, searchlights are tracking them, gunners are ranging on them, and possibly Hun scouts are closing up as well. If a machine does a sharp right-angled turn at 80 m.p.h. or so, the pilot's sense of direction is apt to get confused, and the task of spotting the target has to begin all over again. He has probably never visited the town from the ground, or seen it by daylight in his life; and towns look extraordinarily flat from the air at any time. Still, the target is spotted, somehow, and then the real work begins

(4) Hitting the Target.

When a civilian hears that special sights are employed for dropping bombs, he possibly imagines that the man who does the actual releasing has merely to be precise in aligning a bead in a ring, or something of that kind. Deductions from sighting a gun from a fixed platform are obviously wide of the mark. The bomb possesses a compound flight, in which one element is a forward travel at the speed of the aeroplane: the speed of the aeroplane, therefore, must be accurately known. Secondly the bomb may have a drop of perhaps two miles, during which the wind will affect its path. The dropper, then, must know whether the wind is blowing from ahead, astern, or a flank, and at what strength. Clearly, if you are passenger in a plane which is travelling forward at 80 m.p.h. and creating the illusion of a head-on gale of that strength, it is not exactly child's play to gauge a 5 m.p.h wind blowing from three o'clock to your front. There are other elements in the situation, but the above points indicate that a bomb-dropper's anxieties do not end till he sees his bursts well home.

The Bursting of the Shell.

Bombs may either be dropped singly, or in an irregular series, or in salvoes. But in any case no bomber hopes to get an isolated bomb home on a small target every time. Bombing is not a job of deadly precision, like sniping. It is rather a matter of "grouping" projectiles like machine gun work. Whichever method of delivering the eggs is adopted, it is very certain that the first burst will give away the position of the aeroplane with considerable accuracy. The Hun searchlight and Archie squads will know on what patch of sky to concentrate You decide to streak across the target along a certain line, and to let fly a string of bombs or salvoes as you cross. You may hit or you may miss: but the pressure of your fingers on the bomb lever is in effect a signal to the infuriated defences below. You may have given them the go-by so far, but when the first thunderous explosion is heard, the sky all round you becomes dazzling, and is lashed with bursting shells. In the old days you possibly had the mortification of noticing that only one bomb burst, and of being hit by Archie fifteen seconds later, and gliding down to prison with a "dead" engine. To-day you "observe good bursts" and wriggle clear. What next? Sit back, and get out some light refreshments? If you do you may lose your bearings, and never see home again.

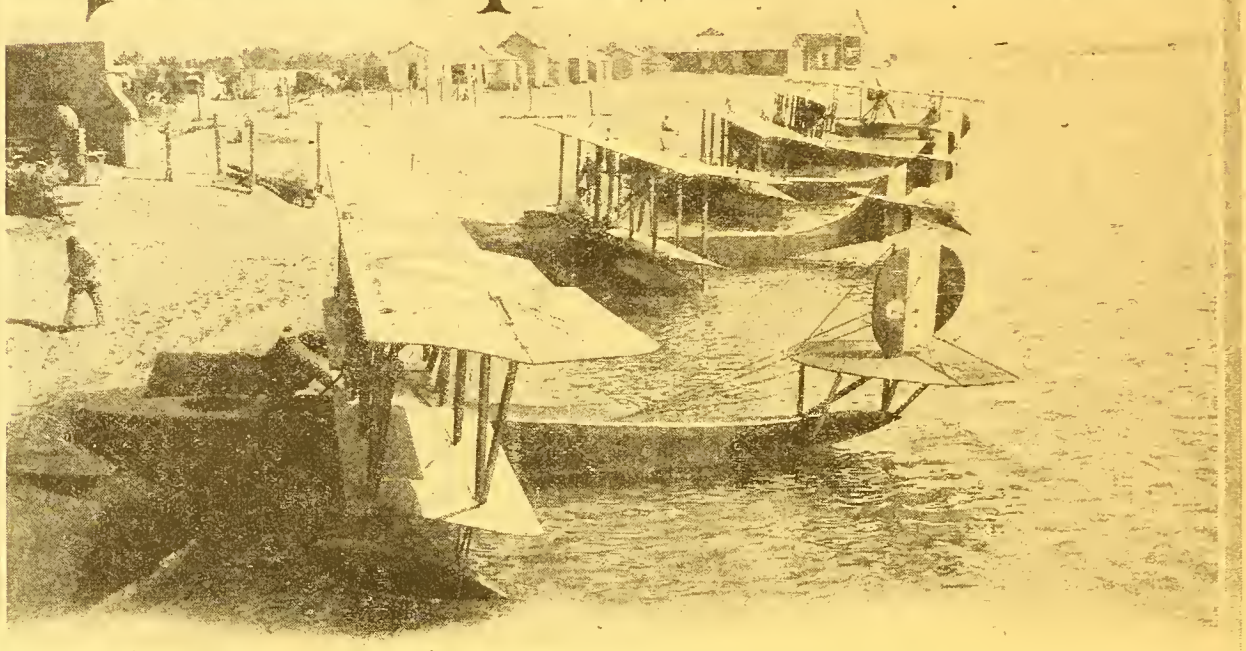
TORQUE.

Abolishing the Bracing Wires.

A RECENT article in these columns indicated that the elimination of bracing wires might add at least 10 m.p.h. to the maximum speed of a fast aeroplane. In support of this statement the author cited the B.E.2c machine, the speed of which increased 5 m.p.h. when streamlined Raf wires were substituted for the ordinary multi-strand cables and circular piano wires. *A fortiori*, a constructional system which dispenses with wires altogether should produce great results, not to mention the fact that the B.E.2c is a very slow 'bus, that modern machines are nearly 100% faster, and that drag increases much faster than the speed.

There are other and more important reasons why the bracing wires are regarded as temporary makeshifts, as a single glance at a "crashed" aeroplane will suggest. It is not always an easy matter to get into the cockpit of a brand new aeroplane; in some cases it is almost as delicate a job as replacing a six-cylinder *monobloc* casting on a row of pistons which have five rings apiece. The pilot must plant his feet and hands clear of flimsy levers, instruments, fabric, and plywood, and insinuate himself between criss-crossed wires Awkward as this job is, it is child's play to extricating oneself from the wreckage of a crashed plane. So long as the struts, etc., remain spaced out at correct distances and angles, the wires run diagonally with plenty of triangular gaps between them. But, if the wooden members are concertinaed into a heap of spilikins, the wires are instantly tangled up into deadly mantraps—and the strength of the main wires runs into tons. A pilot sustains quite a minor "crash"—perhaps, for example, makes rather a crabwise landing. The concussion or the jagged end of a broken strut produces a petrol leak. The escaping spirit ignites, and the fuselage bursts into flame. Maybe the pilot is merely trapped by one foot, caught in the tangled wires. But quite possibly his sole chance rests in somebody amputating that foot with an axe, and doing it quickly. Consequently, whenever an experienced pilot is introduced to a new 'bus, he cocks a wise eye at the accessibility of the cockpit. For obvious reasons, machines in which the pilot is imprisoned in the centre section like a parrot in a cage are not wildly popular; and I once heard a cynic explain that "stagger" is good, because it gives the pilot a chance of falling out before he is roasted when he cartwheels his 'bus in trying to land.

MODERN TYPES OF SEAPLANE



THREE main types of seaplane, of which it is permissible to write, are now on service with the R.N.A.S. The best-known pattern closely resembles an ordinary land machine, except that the engine and propeller are hoisted rather higher than usual in the chassis in order to clear choppy seas, whilst the wheeled undercarriage is replaced by a couple of punt-shaped floats. This model is only usable on tolerably calm days, and is a slow-flying machine of low ceiling compared with land aeroplanes of similar h.p. It is mainly employed on coast patrols, and its chief technical deficiency is that the dual floats are apt to "rack" its structure when it rests on the water in anything but a dead calm. The lightest and fastest type of seaplane may be used either as a fleet scout or for patrolling distant coasts; in any case it requires powerful protection, as it is only used in conjunction with a "mother ship." It approximates far more closely to the land machine, the main differences being that its wheeled undercarriage is detachable, that its engine and propeller are high up, and that it will float on the surface of the sea for quite a long time. It is always launched off a special platform on the deck of the mother ship, and, to use an Irishism, "lands" on the water, from which it is recovered (perhaps) by its parent vessel. The third type is the long-distance patrol, *par excellence*, and is usually called a flying boat. These imposing and massive planes are the largest and heaviest in the world, their weight exceeding that of a Handley-Page, or Gotha, or Caproni, or Sikorsky, and running into many tons. They have a single central hull, strong enough to stand quite lively seas: they carry quite a numerous crew, and are strongly armed. Their obvious merit is that they can carry out quite a lengthy patrol of a distant enemy coast without using a colossal amount of petrol.

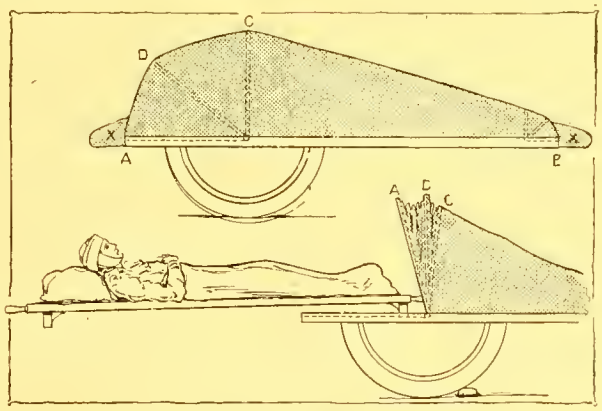
Launching a Seaplane.

The slower and heavier seaplanes rise directly from the water after a short run on their own punt-shaped floats or boat-like keels. The lighter and faster types have drop-undercarriages, and rise from the decks of their mother ships. Such a vessel has a huge deck extending from the funnel to the bows, and when a launch is in preparation the engineers whack the vessel up to its maximum speed. Supposing that the minimum flying speed of the seaplane in question is 40 m.p.h., a fast liner, acting as mother ship, can furnish 30 m.p.h. of the required "getting off" speed; if the starting deck is long enough for the plane to raise the other 10 m.p.h. all will be well. As the ship gets up speed, the captain stands on the bridge and takes very delicate precautions to ensure that the bow of the ship shall point absolutely dead in the teeth of the wind. A variety of wind vanes, ranging from streamers to jets of steam, are provided for the purpose. When the captain is satisfied that the speed is at its maximum and the course correct, the flight officers carry on. Presently the signal is given, the engine of the plane roars out at full r.p.m., the mechanics let go, and the machine rises. When it is a hundred feet up or so the pilot releases the catch of the undercarriage, which is salved by a picket boat. Unfortunately it is not yet possible to "land" a machine on a deck with any certainty or safety. The pilots of these ship aeroplanes have an unenviable time of it.

Sidecar Ambulances.

"CHINOOK'S" REPLY TO "T."

IN *The Motor Cycle* of August 15th a gentleman, who takes unto himself the brief and modest *nom de plume* of "T.." criticises my article on ambulance sidecars, and it need hardly be said that any criticism or suggestion which may lead to the advancement of this serviceable vehicle is heartily welcomed. We can afford to take the recreation side of motor cycling more or less lightly, indulging in such journalistic frivolities as may or may not befit the occasion, but a vehicle on which human suffering and human life daily depend calls for the more serious and thoughtful side of our abilities. My article was written with the worthy motive of being of some little value in the improvement of sidecar ambulances, and I cannot agree with "T." when he lightly dismisses the friction shock absorber as no necessity for the sidecar stretcher. Does he realise the function of a friction shock absorber? If he had ever dealt with sporting and speedy light cars he would realise the value of these fitments, and I have myself possessed two light cars—one a T.T. Singer and the other of Alsatian origin—which were absolutely impossible to drive at high speeds till friction shock absorbers had been fitted to all four wheels. If they are necessary for the car, they are certainly more so for the sidecar with its light body.



A sidecar ambulance suggested by "Chinook."

As regards my remarks to the effect that the stretchers of the sidecars should be interchangeable with those of the cars working in conjunction with them, it was by no means a case of my not "giving the matter enough thought," as the ordinary folding field stretcher could easily be carried aboard a specially-designed sidecar without in any way interfering with the hood and cover mechanism. In the case of the ambulance cars, the collapsible field stretchers simply slide in on their four legs which ride along supporting grooves. Why should not the stretchers be slid into the sidecars in the same way, the sidecar stretcher having at either side of it grooves to take the legs of the field stretcher, which would be pushed in from the hood end just the same as in the cars? A sitting case could then be carried in the ordinary way on the permanent sidecar stretcher, which need not be instantly detachable. Thus in the case of a badly wounded man the field stretcher would be pushed in to rest on top of the sidecar stretcher, being suitably fastened in that position, as in the case of the cars, but otherwise there would be little difference in the *tout ensemble* of the sidecar.

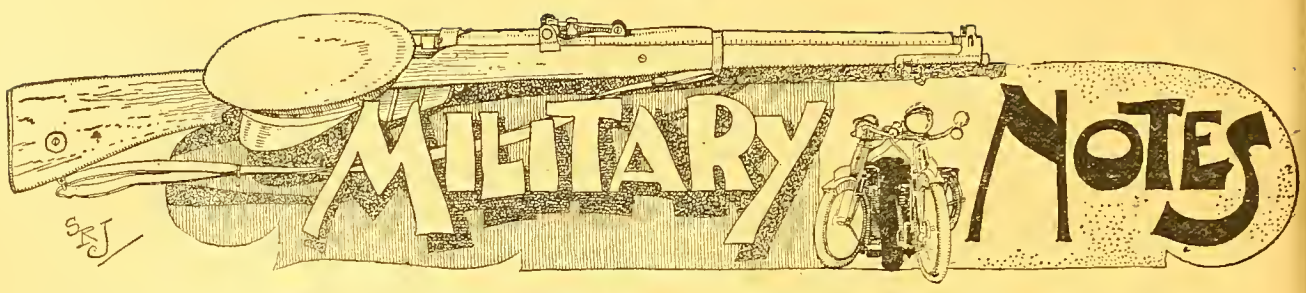
Arranging the Hood and Cover.

It would, of course, necessitate special provision in the hood and cover, but the difficulty is not insurmountable. In the illustration, AB is the permanent sidecar stretcher, with hood and cover up, as we would transport a sitting case in bad weather. According to my suggestion, which "T." can call a gadget if he likes, the only departure from existing arrangements is that it would be possible to open the hood at the point A, and fold this point upwards to the point C, so that a stretcher could be inserted as shown in the sketch. As for the jolting and shaking out of the locking pin of the collapsible stretcher, this would not occur so long as the stretcher were called upon to carry no strands other than those for which it is built, and I ask you, "T.." would any sane man suggest utilising a rickety old French field stretcher, such as we encounter, to hold the whole structure together as our rigid sidecar stretchers do? I may add that Section 99,000 of the B.A.C. have in operation a limousine sidecar which will take a field stretcher on somewhat the lines suggested.

This, I think, covers the points on which "T." challenges my suggestions—except as regards covering the handles of the field stretchers when on the sidecar. This could be done in the same manner as it is done on the Ford ambulances which we relieve at regular intervals, *i.e.*, by means of folding pockets, in one of which "T." could stow away his bidon, while a second might conveniently screen a 75 brass cartridge case stolen from the battery.

I rather fancy I have tumbled to "T's" identity. If not, I tender my apologies: if so, I presume his remarks *re* my leaning towards gadgets which, unfortunately for me, do not work, refer to the patent Harcourt-Chinook radiators he and I tried when stationed together at a certain lonely outpost, and which "T." made so badly that on his first journey out the heat of his engine almost roasted his right boot off his foot! Poor old "T."! My radiators are still in use, and are really effective. But why should he hide his literary abilities under a bushel?

CHINOOK.



To "Lookers On." A D.R.'s Experience in Salonica. The Cambrai Victory.

TO "LOOKERS ON."

LADY HAIG says: "When you see the finish, do not forget what those who have fought have done."

A CALL TO WOMEN.

FIFTY thousand women are required for the W.R.A.F., Q.M.A.A.C., and the W.R.N.S. before next spring.

GRANTS, PENSIONS, AND ALLOWANCES.

MR. JOHN HODGE, M.P., proposes to introduce a Bill to Parliament making better provision for grants, pensions, and allowances to the Naval, Military, and Air Force.

CANADIAN DESPATCH RIDER INJURED.

A FORMER chief of police at Regina, and also at Brandon, Saskatchewan, Canada, Major E. G. Berry, has been seriously injured while doing duty as a despatch rider. He collided with a large rock while riding on a very dark night, and was badly hurt.

Major Berry first served in 1895, and holds three medals—one for an Indian expedition, and two others for the South African War.

DESPATCH RIDING IN EGYPT.

CPL. R. H. EVANS, writing from a Military Hospital, says: "I saw in the 'Blue 'Un' of September 12th a photograph of two D.R.'s whom I knew in Egypt as I was despatch riding near the same signal office. I am now home from France with a bad knee, the result of an accident in Palestine. The photograph is of myself and my favourite 'Duggy.' I do not suppose I shall be fit again to carry on abroad, but am hoping to obtain a D.R.'s job at home."

Cpl. R. H. Evans, R.E.

DEMOBILISATION ESTIMATE.

IT is estimated that demobilisation at the rate of 50,000 men a week will take two and a half years.

A D.R.'s EXPERIENCE IN SALONICA.

WE have had the pleasure of a visit from one of the pukka D.R.'s (Sgt., R.E.) who leapt into the breach, or rather the saddle, in August, 1914, and did yeoman service in France on a B.S.A. In discussing his views of the D.R.'s job generally, he opines that it is much safer now than it was during the first three months of the war, when five of his colleagues were killed by enemy fire. After fourteen months in France he was moved to Salonica, and the thing that struck him most was the extraordinarily bad state of the roads. Out there the Divisional Brigade D.R.'s, who are stationed in the hills, have a much worse time than the corps men. The principal machines used are the Triumph and the Douglas. Owing to the severe road conditions and the hills the Douglas is rather a light machine for the job, and suffers a great deal during the strong Vardar winds. The French have a few B.S.A.'s, the Greeks favouring the Triumph. The Greek D.R.'s possession of brand new machines is a cause of much heart-burning among the English boys, more so as the Greeks show a lamentable lack of mechanical knowledge, the machines suffering in consequence. It is interesting to note that King Peter of Serbia, though no longer a young man, is a sidecar enthusiast, and is to be seen constantly with his Matchless outfit.

A curious case of wholesale robbery recently came to light when a consignment of machines, numbering some thirty, were delivered to the Salonican D.R.'s. It was found that all the magnetos were minus their contact breakers.

Owing to the road conditions in the winter of 1916 the D.R.'s were all mounted on horseback. The sergeant advocates bigger ground clearance and more room between mudguards and wheels. A good deal of trouble was caused by the magneto being placed in such an exposed position. There are two or three very good main roads out there now, made by the troops principally.

Speaking of the difficulty of procuring spares, our visitor said they were often in a quandary and frequently had to improvise them. On one occasion rifle oil had to be used for the engines. Another time butt-ended inner tubes were all that could be obtained, and the riders used an average of one each per day.

UNDER SHELL FIRE.

MOTOR cyclists certainly see life over at the Front. After visiting a ruined town, which had just been shelled, a U.S.A. despatch rider and his officer decided to leave as the shelling began again. The motor cyclist writes: "All the time we were there the shells were singing over our heads, and they finally dropped so fast that we left for home, getting three flat tyres on the way, caused by running over pieces of shrapnel."

THE CAMBRAI VICTORY.

THE *Daily Sketch* war correspondent says: "The German tanks do not appear to have greatly distinguished themselves. At one place three of them came spluttering into action, supporting counter-attacking infantry. One of them stopped dead with a loud gasp as a shell plumped into its squat body, upon which the other two sheered off and made away. Some of our machine gunners had collected several of the German anti-tank rifles — great blunderbuss-like weapons, which take two men to manipulate—and they thought that here was a chance to test them. What the result was on the receding tanks I have not learnt, but I am assured that schoolboys in a rifle gallery never displayed more delight than the men who engaged in this elephantine sniping."

Cpl. A. E. Hollis, M.M., late of the 19th Div. Signals, R.E., who has just transferred to the R.A.F., and is now undergoing training at home. The photograph gives a very excellent idea of the extraordinary amount of equipment a D.R. has to carry when changing quarters. It is quite clear that nothing less than 3½ h.p. can stand the enormous weight which has to be supported.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

SHAFT DRIVE.

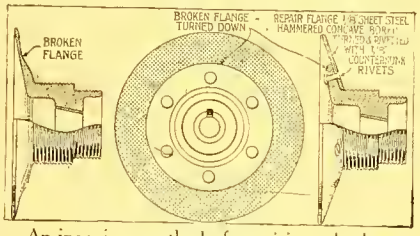
Sir,—I do not think "Ixion" could have ridden a 2½ h.p. F.N. shaft-driven machine. Was that drive generally stigmatised as harsh? I rode one for eighty miles or so in 1910, and my own experience was that one forgot all about the transmission during a ride—which is about the best testimonial I can call to mind. The gear reduction on top was 6 to 1. Was this abnormal? My present mount is a 1916 2½ h.p. four-stroke, and has the same ratio on top.

I consider that F.N. a long way ahead of any lightweight made in the last few years, except in one respect—appearance. Where, even now, can one see such a fine piece of work as that cylinder casting? Where such a short magneto drive, or such a neat fixing for both valve caps? You may recall also the fool-proof change-speed lever and many other good points. I feel sure our British manufacturers could turn out a little dream of a lightweight on those lines, and also feel sure they would charge an enormous price for it. G.H.H.

Birmingham.

A BROKEN PULLEY FLANGE REPAIR.

Sir,—Seeing that someone has had trouble with his pulley (broken flange) gave me the idea of letting other riders have the benefit of my idea of how to repair a broken pulley flange, and to make it almost as good as new in strength.



An ingenious method of repairing a broken pulley flange.

My pulley flange broke a few weeks ago, and I repaired it, as I have described on the drawing I have enclosed, and it is still going strongly.

Trusting this will be useful. E. S. GARDNER.

BRITISH MANUFACTURERS.

Sir,—It may interest you and your readers to have my experience of motor cycle manufacturers.

I purchased a Matchless combination, and, unfortunately, the screen arrived broken.

My mechanic, finding I was using a considerable amount of petrol, examined the carburetter, and found the jet was cracked at the thread, and, therefore, was losing petrol.

Owing to the very bad roads and the weight in the sidecar, on two separate occasions I broke the sidecar springs. I wrote to Messrs. Collier, and I must admit I have been particularly astonished with the enormous trouble they have taken, and their never-failing courtesy.

They sent me a new screen, another set of jets, and two new springs, and have not charged me a halfpenny.

About the machine. I have had many machines, but none like this. The engine—a J.A.P.—is, well it is a J.A.P., and that is enough, and when I go out I know I shall get there.

Of course, I have no interests in Messrs. Collier, but when one hears of black lists wanted, it is only right that those who deserve praise should receive it. "For, let another man praise thee, and not thine own lips. A stranger, and not thine own mouth." AN OFFICER.

Ripon.

THREE SPEEDS OR FOUR SPEEDS?

Sir,—In a recent issue of *The Motor Cycle* you refer briefly to the evolution of change-speed gears for motor cycles. In mentioning the latest type of gear (the four-speed) you say: "And experts tell us that nothing less than four speeds will satisfy the motor cyclist of the future." On some matters even experts disagree, but in deciding whether four speeds are better than three speeds there seems no room for disagreement. The fact is so patent—so obvious. We do not require the superior wisdom of an expert to make the point manifest.

It occasionally happens that in detailing a motor cycle specification a reader includes a three-speed gear. But that certainly is no criterion as to which is best; it merely betrays ignorance on the part of the one drawing up the specification. It is at once apparent that he has never used a four-speed gear; that he is unacquainted with its many advantages over the three-speed gear.

If he is a motor cyclist, it may be that three speeds represent his *Ultima Thule* in gears. It is quite probable that two speeds once represented his ideal. I do not doubt but what this same enthusiast will in due course be asking himself how he ever put up with the discomfort of only three speeds.

That four speeds are infinitely better than three speeds is beyond question. To argue otherwise would indicate not only a lack of mechanical knowledge, which is pardonable, but it would indicate also a lack of commonsense, which is unpardonable.

The primary objection to the three-speed gear is that the middle speed is very unsatisfactory in use, as it provides a ratio which is neither high enough to avoid a big drop from top speed nor low enough to avoid frequent use of the lowest speed. If we raise the middle speed we are compelled to resort to the lowest gear more often, and if we lower the middle speed we increase the drop from top speed. Consequently, we adopt a mean, and so shirk the real remedy.

The correct way to overcome the fault mentioned is to scrap the middle speed altogether and replace it by two speeds, one of which shall be higher than the original middle speed and the other slightly lower. This is precisely what the four-speed gear does. By way of illustration, suppose we take a gear of each type, with simple ratios, so that they can be easily compared—the three-speed, giving ratios of 5, 9, and 14 to 1, and the four-speed giving ratios of 5, 7, 10, and 14 to 1. When the rider is taking a hill which is a little too steep for top speed and yet calls for only a slightly lower gear (and this applies to most hills), is it not far better to have the 7 to 1 ratio available instead of having to drop so low as the 9 to 1 ratio?

It is so in theory, and it is very much so in practice.

In actual use the 7 to 1 ratio is easily the most useful of the lower speeds. Hills can be taken fast without the need for very high engine speed, and traffic can be negotiated very comfortably. There is not the least doubt but what a 7 to 1 ratio adds very considerably to the pleasure of driving, especially on a long run or when touring.

Let the motor cyclist ask himself how often he "hangs on to top" simply to avoid the big drop to the middle speed of his three-speed gear. He will not do this with a four-speed gear because by dropping to the 7 to 1 ratio he will take the hill much faster and more comfortably than by hanging on to top speed. Moreover, the change down is good for every part of his machine—engine, transmission, and even the tyres.

It will be observed that the second speed (10 to 1) of the four-speed gear is slightly lower than the middle speed of the three-speed gear. This is also an advantage, as it often saves the need for employing the lowest gear. There are, in fact, many occasions when the three-speeder will be on lowest speed and the four-speeder only on second speed.

My experience is that the four-speed gear is a bigger advance on the three-speed gear than the latter is on the two-speed gear. Both the two-speed gear and the three-speed gear have the same evil—the drop from top speed to the next speed is far too great.

The four-speed gear is equally advantageous whether on single, twin, or four-cylinder. The single-cylinder four-speed is a long way ahead of the single-cylinder three-speed. The presence of that 7 to 1 ratio adds considerably to the comfort of the machine and the pleasure of driving it. Four speeds are very convenient to use; more speeds would probably be confusing. A four-speed box can be made as simple and compact as a three-speed box; in fact, some of the three-speed boxes fitted to motor cycles look big enough to hold two four-speed boxes.

Probably the war has delayed the general adoption of the four-speed gear, but there is little doubt but what it will speedily oust the three-speed gear when times are normal. With the advent of the four-speed gear the ordinary change-speed lever and notched quadrant should be scrapped, as it would be too confusing with four speeds. A neat "gate" change should be employed, the gate quadrant lying snugly against the tank. This form of gear control is extremely simple and very easy to use, with the further advantage that only short movements of the control lever and sliding clutch elements are required.

As regards the gear itself, the gear shafts should be as short as possible, the wheels always in mesh, the dog clutches very strong, and the layshaft should be geared *down* when on top speed—not *up* as in most gears. None of the speeds should be obtained through more than two pairs of wheels, and both mainshaft and layshaft should run in ball bearings.

In the article referred to in my opening paragraph it is stated that in the average four-speed box there are *six* or eight gear wheels. Six wheels can certainly be employed to give four speeds, but the chief disadvantage of employing only six wheels is that on one of the speeds (both up and down) it is necessary to engage two different dog clutches to effect one gear change. It is like engaging second speed and then third speed to obtain a single change of speed. Quite a nice little hustle to make the change on a bit of 1 in 5 or 6. The simplicity of a gear does not lie in the number of wheels that are employed—ease of manipulation is a more important consideration. A.

Manchester.

BRITISH AND AMERICAN MACHINES.

Sir,—The Rev. A. M. Walmsley's letter *re* above has produced in *The Motor Cycle* of September 5th a coincidental offensive from "Ixion" and a defensive from "Chinook." Being in absolute accord with the reverend gentleman's point of view, I may perhaps be excused for venturing to support his contentions.

"Ixion" asserts that dual clutch control and interconnected clutch and gear shift are twin "concessions to dud drivers" (!). Will "Ixion" tell us which class of driver is most entitled to that uncomplimentary designation: *(a)* the driver who changes gear by withdrawing the clutch and synchronising (approximately) his gear shaft's speeds by judicious manipulation of the throttle to ensure a silent change; or *(b)* the driver who adopts the slipshod method of merely (or should it be merrily?) lifting exhaust valve to attain the same end?

If *(a)* be correct, how is it possible with the hand-controlled clutch he mentions to perform the three necessary simultaneous operations with two hands, seeing that clutch and throttle respectively engage left and right hand, leaving gear shift out of the picture? On the other hand, if *(b)* is correct, what a lot of duds our car manufacturers are! Clearly dual control, *i.e.*, handle-bar and foot pedal, is desirable.

The mechanical oiling of the American type is credited by "Ixion" with no greater efficiency than that of the drip feed! Why, then, are some British manufacturers talking of discarding the sight (?) drip feed, and reverting to the plain pump again? The American pump is integral with the power unit, therefore after a few minutes' running gets warm, and thus ensures an equal supply of oil to the engine winter and summer alike, *without adjustment*. Which drip feed does that?

"Chinook's" letter breathes bias, and is practically devoid of sound argument. His inane parenthetical ejaculations savour of the cornered M.P. answering inconvenient questions. Unanimous and devastating would be the calling on "Ye gods!" if "Chinook's" definition of twist grip control was correct—his classic "three positions of operation" to wit!

Apparently "Chinook" is another of the clan who prefer the easy way of changing gear by ill-treating the exhaust valve; therefore one may well feel flattered at being able to subscribe oneself ONE OF THE DUDS.

Belfast.

Sir,—It is rather deplorable that the correspondence on this subject is becoming somewhat personal, and, instead of the good points or faults of the motor cycles of each country being placed before the readers of this paper in an impartial manner, the writers on both sides are simply trying to be funny at each other's expense.

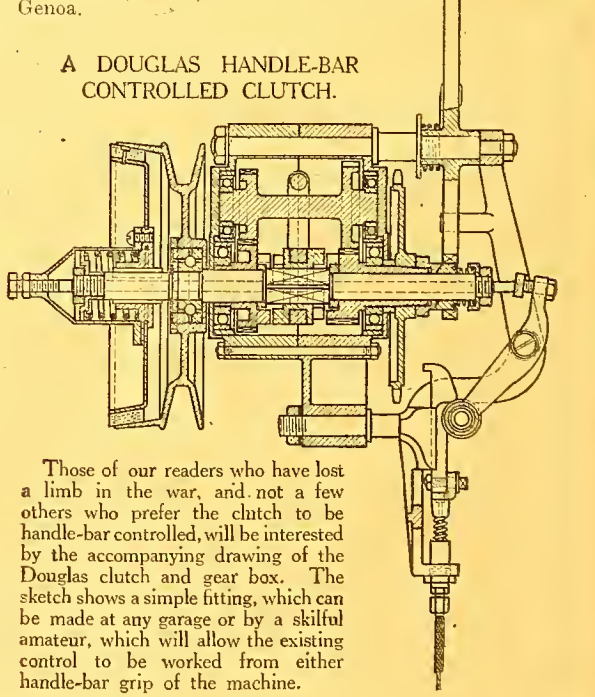
For, after all, both British and American machines are excellent productions of their kind; and whereas the one is a machine *par excellence* for such conditions as one generally finds in Europe, the other is probably a better machine for colonial work. The question whether grip controls or lever controls, or hand-operated clutches or pedal clutches, are the better is merely a matter of taste: and the point to be remembered is whether each type is efficient or not. One man will be satisfied with a simple single-speed two-stroke, and get an immense amount of pleasure and useful work out of his little mount, whilst another will not be content with anything less than a 7-9 h.p. heavyweight, fitted with luxuries such as a variable gear, free engine, electric lighting, etc. That the American heavyweight 7-9 h.p. machine is an excellent production, there is not the least doubt: but it is also beyond dispute that no other makers can touch those of the old country so far as the medium-weight 3½-5 h.p. machine is concerned.

British machines of every kind have given the utmost satisfaction in every theatre of war, and, I should imagine, under such severe conditions as would be difficult to find in any of our colonies under normal times (I am a Colonial); and it now remains for the Americans to show the motor cycling world what they can do under similar conditions, weight for weight and horse-power for horse-power.

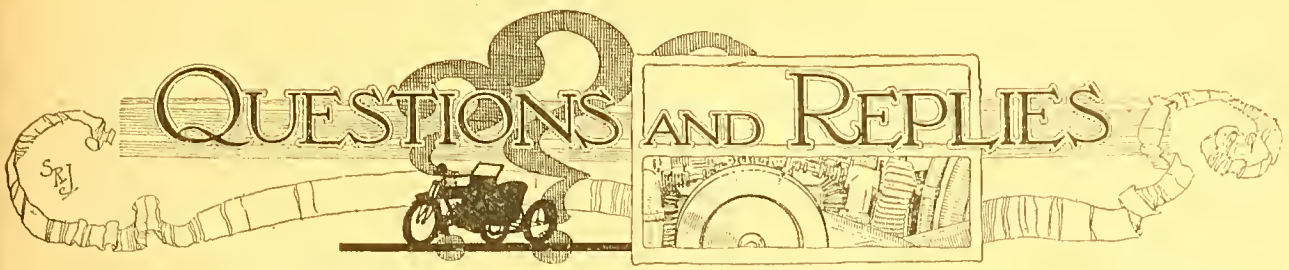
At any rate, let us get away from personalities, and come down to serious and solid discussion. D. MADGE.

Genoa.

A DOUGLAS HANDLE-BAR CONTROLLED CLUTCH.



Those of our readers who have lost a limb in the war, and not a few others who prefer the clutch to be handle-bar controlled, will be interested by the accompanying drawing of the Douglas clutch and gear box. The sketch shows a simple fitting, which can be made at any garage or by a skilful amateur, which will allow the existing control to be worked from either handle-bar grip of the machine.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply**. Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope and should be kept distinct from questions bearing on technical subjects.

Douglas Timing.

Could you please tell me the best positions for setting a Douglas timing gear?—C.C.C.

The timing recommended by the Douglas people themselves is as follows: The exhaust valve should close just a shade, say $\frac{1}{16}$in., after the piston has completed the exhaust stroke, and the inlet valve open a shade, say $\frac{1}{16}$in., before the piston has begun the induction stroke. If you time the valves for one cylinder in this manner the valves of the other cylinder will be automatically correct.

Sidecar Wheel Springing.

(1.) Is there any patent on the market dealing with the springing of a sidecar wheel? (2.) What would be the cost of taking out a patent for such an idea, and to whom should I have to apply? (3.) I am unable for many reasons to test my idea in practice, but it seems to work in theory. Could I get some reputable firm to experiment with the idea before I patent it, and, if so, what firm would you recommend? (4.) Could you give me your opinion as to the monetary value of such an invention? (5.) If there are many sprung sidecar wheels, have you on hand a drawing of the one which, in your opinion, is the best on the market at the present time?—G.W.B.

(1.) There are many patents on the market dealing with the springing of sidecar wheels. We cannot give you the exact number, but we should imagine it probably exceeds one hundred. (2.) The cost for provisionally protecting an idea is £1; this will keep the idea safe for six months only. If afterwards you decide to proceed further with the patent, we should advise you to get into touch with a patent agent as regards further steps, and he will then inform you accurately as to all details of costs. (3.) We should strongly recommend you to protect the idea before handing it over to any firm for test. After you have protected it, you may offer it quite safely to any firm of standing in the trade. (4.) We regret we can give you no answer to this question. (5.) As to which is the best system of sidecar springing is largely a matter of opinion, and we should not care officially to commend one in preference to the other. All the various sidecar wheel springing devices have been illustrated at different times in *The Motor Cycle*. The systems used on Gloria and Chater-Lea sidecars are both very good.

Removing the Gudgeon Pin.

I want to know if you would tell me how to remove the piston pin of a 1911 or 1912 3 h.p. twin N.S.U., as I wish to rebush the gudgeon pin bearing, etc. The piston has no holes drilled through its walls, as my other mounts had, and the only indication of any fastening whatever is a small rivet in the front of each piston. Is the piston made in two pieces, outer shell and separate inside, as there is not the least sign to indicate this?—W.R.

The piston is not made in two pieces. The gudgeon pin is held by a broad ring, which must be sprung off in the same manner as a piston ring before the gudgeon pin can be removed.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Armstrong Gear.

Will you kindly tell me if the hole through the pulley of my 3½ h.p. Rover should have a ball release arrangement in it, or is it merely a drilled hole into the crank case to release compression? Should I be able to revolve the engine on the Mark III. Armstrong three-speed with wheel on the ground stationary? Also, are they still pumping oil at Ramsey, or has the Government given up the idea in case it might have to cancel some restrictions? How many gallons of oil can Scotland produce per annum?—O.F.C.

The hole to which you refer is simply for the purpose of releasing crank case compression. It is not possible to revolve the engine with the belt transmission when the road wheel is at rest and on the ground, in the case of the gear mentioned. Pumping oil at Ramsey has been relinquished only because the supply was rapidly exhausted and it was proved to have been due to leakage from storage tanks, as has been stated already in *The Motor Cycle*. We regret that we cannot give you the output of Scottish pits.

Purchasing a New Machine.

I have been riding a 1914 4 h.p. Triumph with sidecar for the past two years, but have now decided to get another outfit. Before purchasing I should be very much obliged for your valuable advice, as I myself know but little of the merits of different makes. Personally I fancy a Sunbeam, but suppose a new one is almost unprocurable now. Would you recommend one of the 1916 8 h.p. models with Lucas dynamo set and No. 2 sidecar, if I could get one second-hand in good condition. Also would this be reliable for my business (farming), which means journeys in all weathers, and what would be the fuel consumption? What make is the engine of the 1916 Sunbeams? as I am given to understand the present machine is not fitted with a Sunbeam engine.—G.B.

We do not think you could possibly do better than purchase a Sunbeam motor cycle, as you suggest. The engine fitted to this machine is the M.A.G., and the combination of this engine and the equipment you describe are in every way satisfactory. You may be able to obtain a new machine if you can get a priority certificate from the Priority Branch, Ministry of Munitions, Whitehall, W. You could possibly purchase a second-hand Sunbeam by advertising for one in our columns.

RECOMMENDED ROUTES.

SUDBURY (SUFFOLK) TO LONDON.—G.B.A.

Sudbury, Halstead, Braintree, Chelmsford, Ongar, Epping, London.

LONDON TO BIRMINGHAM.—J.V.

London, Edgware, St. Albans, Dunstable, Fenny Stratford, Stony Stratford, Daventry, Dunchurch, Coventry, Birmingham.

BIRMINGHAM TO LIVERPOOL.—H.W.F.

Birmingham, Sutton Coldfield, Rugeley, Weston, Stone, Pipe Gate, Nantwich, Tarporley, Chester, Birkenhead, and by ferry to Liverpool.

STRATFORD-ON-AVON TO LONDON.—J.V.

Stratford-on-Avon, Ettington, Banbury, Aynho, Bicester, Aylesbury, Tring, Watford, Edgware, London; or Stratford-on-Avon, Shipston-on-Stour, Long Compton, Enstone, Bletchington, Islip, Wheatley, Stokenchurch, Beaconsfield, Uxbridge, London.

SPARKLETS

Successful Tyre Concern.

The steady progress made by the Beldam Tyre Co., Ltd., during the past year is evidenced by the fact that at the recent general meeting of shareholders a final dividend of 5% was declared, making a total dividend for the year of 10%. An increase of 15% has been made in the price of outer covers.

Hub Gear Repairs.

The County Cycle and Engineering Co., 64, Staines Road, Hounslow, Middlesex, inform us that they have purchased from F. E. Jones, of Muswell Hill, his complete stock of Armstrong and Sturmey-Archer motor cycle hub gear parts. The company also inform us that they have a very complete stock of spares for all types of the principal hub gears, and can execute repairs very promptly.

The Post-war O.K.

Messrs. Humphries and Dawes, Ltd., makers of the O.K. lightweight, advise us that, although they are now exclusively engaged on aircraft production, they are keeping in mind post-war motor cycle interests, and anticipate a greatly augmented output on account of the increased size and capacity of their works at Birmingham.

Review.

A very well got up booklet is the instructional handbook of the New Imperial 8 h.p. motor cycle. All the most important parts of the machine are fully illustrated and described, and the information given on the care and upkeep of the machine should prove useful to novice and experienced rider alike.

Copies of this very useful and interesting publication may be obtained on application to Messrs. New Imperial Cycles, Ltd., Princip Street, Birmingham, price sixpence.

"Works Lighting."*

That efficient lighting (natural and artificial) has a big effect on works output and greatly minimises the liability of accidents is a recognised fact; but, despite the importance of the subject there is a remarkable lack of reliable data connected with it for the guidance of the works manager or those concerned. It is therefore interesting to find the problem tackled from the proper standpoint by someone with the requisite knowledge and intimate acquaintance with the details of the proposition. "Works Lighting," by D. H. Ogley, D.Sc., then fills an urgent need which is fully explained in the preface by Professor E. W. Marchant, D.Sc., the well-known authority on lighting. The book is well written and copiously illustrated, and the technical details set forth in a most readable manner.

* Iliffe and Sons Ltd., 20, Tudor Street, E.C.4. Price 7/6 nett, post free 7/10.

The New Moon Chart.

We have received one of Messrs. C. A. Vandervell's excellent moon charts for October, compiled by Mr. A. H. Midgley, their chief engineer. This gives a clear idea of the increasing darkness and the waxing and waning of the moon during the present month.

A Balance Sheet.

Messrs. Bradbury and Co.'s annual statement of accounts to June 30th, 1918, shows a profit of £21,704 13s. 8d. nett. £20,000 has been placed to the Reserve Fund, and payment of a further dividend of 10% on the preference shares for the half-year and 10% on the ordinary shares for the year ending June 30th (both free of income tax) has been recommended.

New B.S.A. Publication.

The B.S.A. Co. has issued another artistic and attractive booklet entitled, "With the Flag through German East Africa." It is a remarkably interesting publication, running to thirty-two pages, copiously illustrated with photographs of the B.S.A. motor cycle under Service conditions in Africa. Letters from the many ultra-satisfied Despatch Riders and officers using the B.S.A. machine form the reading matter, and a foreword is provided by Mr. W. Whittall, the author of "With Botha and Smuts in Africa." The whole is well got up on art paper, and forms absorbing reading for all interested in the manner in which the B.S.A. as a representative of the British motor cycle industry has augmented and maintained the highest traditions of the British motor cycle. Copies of this booklet can be obtained free on application to the B.S.A. Co., Birmingham.

Little Fish.

"Salesmanship." M. E. Ricketts, The Pianomaker, 17, Little Tichfield Street, London, W.1. "Salesmanship" is hardly the book to interest the average motor cyclist reader; but we have received a copy for review, and in reading it came across one little paragraph: "No salesman on earth can tell for certain where the next big sale is coming from, so it behoves him to give the same attention to the 5s. customer as the £20 one. 'Little fish are very sweet.'" It struck us that this would not be at all a bad motto to hang up in some of the principal garages throughout the country.

King's Fund for Disabled.

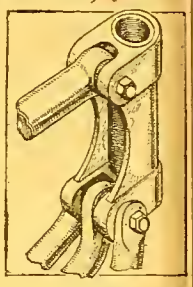
The King's Fund for Disabled Officers and Men of the Navy, Army, and Air Force, opened by His Majesty with a gift of £78,000, is designed by the Minister of Pensions, the Right Hon. John Hodge, to raise a minimum of £3,000,000 to re-establish in civil life those gallant Britons who have fought and suffered for their country and for civilisation. This fund is wholly apart from any State aid, and is a voluntary monument of the nation's gratitude to our heroes who, disabled as fighters, have now to be re-established in civil occupations. The King's Fund provides grants of various sums to enable those who have given so much for us again to start life as contented, self-supporting citizens. Donations will be received gratefully by the Minister of Pensions, Westminster House, S.W.1.

A New Catalogue.

We are in receipt of a booklet entitled "Aircraft Fittings of Quality," published by S. A. Lamplugh, King's Road, Tyseley, Birmingham. Among the many specialities sold by this firm are petrol taps, compression taps, drain taps, grease cups, lock nuts, lubricators, petrol filters, etc. The booklet will be sent on application to any of the aeroplane and motor cycle manufacturers who are interested.

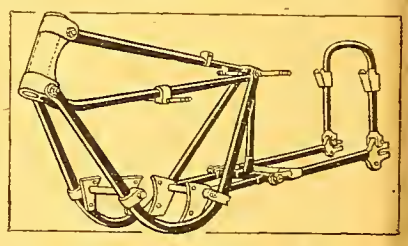
FRAME CONSTRUCTION WITHOUT BRAZING.

WE are able to illustrate some designs for frame construction by a French reader. As brazed lugs are at present unprocurable, he proposes to connect up the frame members by means of plates and bolts. This, by the way, is standard practice on the Scott three-wheeler. The design of a rear spring frame incorporates two long leaf springs, which should assure comfortable riding, but it would appear to add greatly to the weight of the machine.



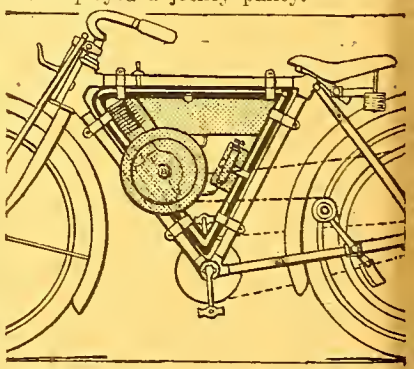
A method of constructing a steering head without brazing.

Details are also given of a self-contained motorised cycle unit, in which the engine, tank, etc., are carried in a triangular frame which is attached by



A motor cycle frame with cantilever springs at the rear.

lugs to the cycle frame, somewhat similar to the original Motosacoche idea, which also employed a jockey pulley.



An extra diamond frame inserted in the frame of a cycle. This is made of an old bicycle tube and special lugs to carry the engine and absorb vibration.

SPHINX

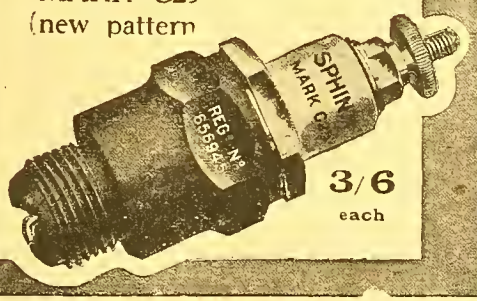
Scenes the Sphinx has looked upon.
No. 7—Kitchener marching to Omdurman 1898.

Unchanging, mysterious, aloof—as when before its sightless eyes tramped the armies of an ancient world gorgeous in purple and gold—the Sphinx stood steadfast while the winding column of Kitchener's force marched to victory at Omdurman. So in the pageant of history have a hundred armies, the might of a hundred empires, marched and counter-marched while it alone remained unmovable, unchanging—ever the same.

Apt emblem is the old Sphinx for Sphinx Plugs of to-day, world-famed for stern efficiency and lasting power. In every emergency, through every turn of fortune, Sphinx Plugs remain unchangeably the same, enduring, utterly reliable.

THE SPHINX MFG. CO., BIRMINGHAM.

MARK C25
(new pattern



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All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

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Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

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MOTOR CYCLES FOR SALE.

A.J.S.

1916 A.J.S., 6h.p., lamps, speedometer, horn, perfect condition; £80.—Below.

1916 A.J.S. Combination, 6h.p., lamps, speedometer, horn, hood, screen, spare wheel, unscratched, and as new; £110.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

1916 A.J.S. 4-5h.p. Combination, spare wheel, full accessories; £68.—Ross, 86, High Rd., Lee. [8906

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

1917 A.J.S. Combination, complete lamps, spare wheel, etc., done 500 miles; £108, cost £127.—Cross, Agent, Rotherham. [X9009

A.J.S., 2¾h.p., 3-speed countershaft, exeellent condition, speedometer, lamp, etc., £42; 2-speed ditto, £35; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [8750

1916 4h.p. A.J.S., Binks carburetter, with A.J.S. sidecar, spare wheel, locker, wind screen, side wings, hood, etc., will do 65 m.p.g., perfect mechanical order.—Particulars, Robinson's Garage, Green St., Cambridge. [9068

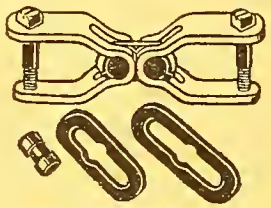
A.J.S. 6h.p. 1915 Combination, interchangeable wheels, also spare wheel, and about £10 worth of accessories, wind screen, luggage grid, etc., splendid condition; accept £72 cash; seen after 7 o'clock.—24, Grosvenor Av., East Sheen, S.W.14. [8991

A.J.S. Spares; prompt delivery. — Cyril Williams, Chapel Ash Depot, Wolverhampton. [4997

FORWARD FASTENERS never Fail.

Fit them and be sure your ride will not be spoilt—not even interrupted—by trouble with your belt.

Careful design, extra strength and care in the selection of materials all ensure this.



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Modern Motor Cycles, solo or combination. Any good make.

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We are well qualified to undertake the repair of Magnetos of all makes, and to supply spare parts, being, as we are, one of the most experienced firms manufacturing Magnetos

SIMMS MOTOR UNITS, LTD.,
Percy Buildings, Gresse Street, London, W.1.

MOTOR CYCLES FOR SALE.

Alldays.

1915 Alldays Allon, 2-speed, very nice order; 86, High Rd., Lee.

RIDER TROWARD and Co., 31, High St., I stead.—Allon, 1916, 2-speed, 2-stroke; 29 gns.

ALLON, 2¾h.p., 2-stroke, 2-speed, clutch, model, 2 lamps, perfect condition; £26 trial.—39, Crewdson Rd., Clapham Rd., London, S

ALLON, 1917, 2¾h.p., 2-stroke, free engine, 2 s guaranteed new condition throughout, mileage —Thorn, 32, Second Av., Selly Park, Birmingh

ALLDAYS Allon, new single speed, £38; dit speed countershaft, £45; ditto, 2-speed co shaft, hand controlled clutch, £48; second-hand 2- as new, £39/10; ditto, with lamps, horn, etc., extended payments or exchange.—Service Co., 292, Holborn, London.

ALLDAYS Matchless, 3½h.p., Sturmey 3-speed clutch, kick start, Millford coachbuilt sidecar Dunlop combination, engine thoroughly overhauled platinums, mechanically perfect, complete with lamps (Lucas), spare tyre and tube; any trial; Piemont, Elmbridge Rd., Gloucester.

Ariel.

CROW Bros., Guildford, Ariel agents.—New and hauled second-hand models in stock.

Auto-Wheels.

WALL Auto-Wheel, Model de Luxe, in perfect not run 100 miles; price £10.—Maxted, Chambers, Burton-on-Trent. [

Bat.

1914 6h.p. Bat Combination, 3-speed, K.S.; £48 High Rd., Lee.

BAT-J.A.P., 7-9h.p., 2-speed countershaft; £2 exchange for lower power.—Wyatt, Hunst

BAT-J.A.P. 6h.p. Twin, 1913, spring frame, i fect condition, very fast; £18.—Wells, C Garage, Woodford Green.

RIDER TROWARD and Co., 31, High St., F stead.—Bat-Jap, 1914, 6h.p., 3-speed sp model, re-enamelled, 39 gns., with 2-seater sidec gns.; Bat-Jap, 1910, 3½h.p., variable gear, 14 g

Blumfield.

1914 6h.p. Blumfield, 3-speed; £30.—Ross, 86, Rd., Lee.

BLUMFIELD Engined T.T. Machine, 1915, special picked engine, very fast and powerf good condition throughout, and guaranteed; exch 30 gns. (21).—The H.C. Motor Co., 347, Finchley N.W.3 (close to Finchley Rd. and Swiss C stations). 'Phone: Hampstead 4651.

Bradbury.

RIDER TROWARD and Co., 31, High St., E stead.—Bradbury, 1913, 4h.p., 2-speed, clute enamelled; 32 gns.

4h.p. Bradbury, 2-speed, free engine, kick st grand hill-climber, in first-class running 1914 model; 21 gns.—Cutland, Wellington, Som. [

BRADBURY and Sidecar, 4h.p., 2-speed, lamps, etc., splendid order throughout; any trial; gain, £28/10.—1, Gunnersbury Lane, Acton, Lon

BRADBURY, 1914, 4h.p., 2-speed gear, free e kick starter, in excellent running order; wi cept £25; seen after 6 p.m., or week-ends.—Wya Union Grove, Wandsworth Rd., Clapham, S.W.8.

B.S.A.

1916 B.S.A. Combination, 3 speeds, clutch, starter, lamps, speedometer; £55.—36, De I St., Kennington, S.E.19.

B.S.A., 1914, 4½h.p., countershaft 3-speed, carburetter, and coachbuilt sidecar, speedon and Lucas lamps, in perfect running order; £50.—I Baker, 40, Sotheby Rd., Highbury Park, N.5.

B.S.A., late 1915, 4½h.p., 3-speed, kick st countershaft gear, free engine, chain-cum-belt, No. 2 B.S.A. sidecar, condition almost as new, horn, lamps, distance ridden not more than 3,000 n sole reason selling, owner no further use; price £ Box L7.489, c/o *The Motor Cycle*.

RIDER TROWARD and Co., 31, High St., H stead.—B.S.A., 1916, 4½h.p., 3-speed, all-c underslung couch sidecar, 65 gns.; solo, 58 gns.; B 1916, 4½h.p., 3-speed, chain-cum-belt, cane sid 62 gns., solo 58 gns.; B.S.A., 1915, 3½h.p., 2-s clutch, pedal start, renovated, 32 gns.

Calthorpe.

CALTHORPE-J.A.P., 2¾h.p., 2-speed Enfield in first-class condition; £25.—Wyatt, Hunsta

RIDER TROWARD and Co., 31, High St., H stead.—Calthorpe-Jap, 1916, 2-speed, sloping clutch, 29 gns.; Calthorpe-Jap, 1915, 2-speed, c 24 gns.; Calthorpe Junior, 1914, 2h.p., 2-speed, 1

MOTOR CYCLES FOR SALE.

Calthorpe.

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—C. J. Rams, 91, John Bright St., Birmingham. [0955

CALTHORPE, 2-stroke, 1915, 2-speed, knee-grips, Senspray carburetter, all lamps, good tyres, fine condition, very carefully used; £25.—Mebes and Mebes, 154-6, Gt. Portland St., W.1. [8708

CALTHORPE-J.A.P., 2¾h.p., late model, 2-speed, fully equipped, good condition; £26/10, or exchange 4½h.p. combination, cash adjustment.—Goss, 71, South Side, Clapham Common, S.W.4. 'Phone: Brixton 322. [9006

CALTHORPE, 1915, 2-stroke, 2 speed, just been overhauled, complete and guaranteed; exchanges; 25 gns. (20).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9113

Centaur.

RIDER TROWARD and Co., 31, High St., Hampstead.—Centaur, 1913, 3½h.p., 2-speed, clutch, handle start, 29 gns.; with sidecar, 54 gns. [9074

Chase.

1914 Chase-Jap, 2-speed, clutch, C.B. sporting sidecar; bargain, £35.—86, High Rd., Lee. [8910

Clyno.

2½h.p. Clyno 2-stroke, 2-speed model; £20.—Wauchope's, 9, Shoe Lane, London. [9028

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London. [8752

CLYNO, 1913, and sidecar, with hood, screen, lamps, spare wheel, complete; price £28.—Maxted, Bridge Chambers, Burton-on-Trent. [X9002

1915 Clyno Combination, complete with spare wheel, Lucas lamps, horn, speedometer, and tools; £75.—Missin, Cottingham, Hull. [X9004

CLYNO Twin and Sidecar, little used, exceptionally well fitted machine; owner called up; two disc wheels, and accessories; £80.—Wait and Co., Ltd., Queen St., Leicester. [9016

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; ditto, new single speed, £34; ditto, 2-speed countershaft, £41; E.P. or exchange.—Service Co., 292, High Holborn, London. [8741

Coventry Eagle.

COVENTRY Eagle, new 2-speed countershaft, band controlled, £44.—Service Co., 292, High Holborn, London. [8753

COVENTRY Eagle, 1915, 2¾h.p., 2-stroke, Thomson-Bennett mag., Senspray, Villiers engine, everything excellent condition; £20, or offer.—1, Campbell Rd., West Croydon. [X8987

Dayton.

DAYTON Lightweight, 1¾h.p., only done 500 miles, 140 m.p.g., spare tyre, tube, all accessories, perfect order; £20.—Morris, 11, Portland Rd., Holland Park Av., W. [8936

Douglas.

DOUGLAS 1914 4h.p. Combination, perfect order.—15, Bassett Rd., W.10. [0960

DOUGLAS, 2¾h.p., 1915, good condition, accessories; 30 gns.—Dr. Hay, Sutton, Ely. [8905

4h.p. Douglas, 1914 or 1915 model, smart machine; £45.—Wauchope's, 9, Shoe Lane, London. [9013

DOUGLAS (July, 1914), 2-speed, stored 2 years; accept £34.—436, Whitehorse Rd., Thornton Heath. [8981

DOUGLAS.—Write us your requirements; either new machines or second-hand.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS Motors.—Send your name for waiting list now to Gibb, Douglas Expert, Gloucester. 'Phone: 852. [4749

DOUGLAS, 1914, 3½h.p., sidecar, lamps; first reasonable offer; would separate.—24, Beauval Rd., East Dulwich. [8978

DOUGLAS, 2¾h.p., lamps, horn, in good running order; £15.—C.H., 227, Beaconsfield Rd., Southall, Middlesex. [8942

DOUGLAS 4h.p. 1915 Combination, 3-speed, splendid condition, little used; offers.—Coffin, Holwell, Sherborne. [X8963

DOUGLAS, just rebushed, Bosch, lamps, horn, new cover; bargain, £15.—152, Camberwell Grove, Camberwell. [8966

DOUGLAS, 1911, single speed, Bosch, good condition, flywheel wants fixing; £10.—41, Sistova Rd., Balham, S.W. [8901

DOUGLAS, 1916, 2¾h.p., perfect, accessories; £47/10.—Lt. Disney, R.A.F., Rossie, Kingston Hill, Surrey. [8983

1915 Douglas, 2¾h.p., 2-speed, very good condition; £42/10.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

DOUGLAS, 1915, 2¾h.p., clutch model, speedometer, lamps, horn, hardly used; £35, or nearest; letters only.—Jefferd, 54, Empress Av., Wanstead Park, E.12. [X8947

SALE ON COMMISSION

Owing to the immense growth of Sales on Commission which we are effecting at the present time, we have opened a separate Branch to deal with these sales, and are open to take more Motor Cycles and Light Cars in on the following terms:

5% Commission on sale—no sale, no charge; advertised, garaged, cleaned, insured, free, and collected free in London radius. In order to let our clients fully understand our terms of sale, we have inserted this advertisement, which should be cut out and put on one side for future reference.

FREE ADVERTISEMENTS.—All machines taken for sale on Commission are advertised free, both under our small advertisements and under our display advertisements. They are also inserted in our fortnightly List of 150 machines for sale.

FREE INSURANCE.—All machines taken in for sale are insured for their full value against Aircraft, Fire, and Burglary.

FREE CLEANING.—All machines taken in are thoroughly cleaned, and well greased, as soon as they come in. They are also **kept clean** all the time they are in our possession.

FREE GARAGE.—No charge is made for garage whilst machines are kept in our possession.

FREE COLLECTION.—Machines are collected free within a ten mile radius of Hampstead; outside that radius, by appointment. The mounts of country clients are collected free from Station.

NO SALE—NO CHARGE.—Should the machine be removed before a sale is effected, **there is no charge of any sort** to pay. The machine is handed to owner, without any queries being raised, the moment it is required.

FREE ADJUSTMENTS.—Minor adjustments, such as plugs, belt fasteners, Bowden wires, nuts, mending punctures, etc., are made free of charge; but will be charged for if done to order, and the machine removed before sale.

Reasons **WHY** you should entrust your machine to us:

1. There is no need to be in to answer callers.
2. The cost of advertisements is dispensed with.
3. There is no need to get the machine in a saleable condition. We do the cleaning and adjustments.
4. We are in touch with many prospective clients, and our lists go all over the country.
5. There is no need to worry about garage or insurance; in fact, there is no need to worry about anything. **ALL** that is necessary is to bring or send the machine to us, or write or 'phone us to collect it. We hand you an official receipt, with the lowest figure you will take inscribed on it, and we then get the **best price we can** above your lowest reserve. **ALL** responsibility for the care of the machine rests with us, and in due course you will receive a cheque for the machine.
6. We effect **rapid** sales.

IN THE PAST TWELVE MONTHS WE HAVE SOLD OVER 200 MACHINES ON COMMISSION.

WARNING.—For the reputation of our business we only accept good machines under the above terms. Please do not send us crocks to sell—we can't do with them.

Rider Troward & Co.

31 & 40b, High St., Hampstead,

OPEN 8 p.m. AND SUNDAYS.

'PHONE 5392.

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 1914, 2-speed, complete with lamps, horn, and knee-grips, 36 gns.; lady's ditto, £39; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [8739

DOUGLAS, 1913, little used, practically as new, engine perfect, T.T. bars, Binks, Bosch, Dunlops; best offer over £30.—3, Ashley Park, Bristol. [X8917

DOUGLAS, 1915, 2¾h.p., 2-speed, Lucas lamps, fitted with College mud shield, etc., accessories, in fine condition; 35 gns. 66, Shobnall St., Burton-on-Trent. [X8999

DOUGLAS, 4h.p., late 1915, and enclosed light coach sidecar, complete with screen, lamps, and accessories, little used, and perfect condition; grand bargain, £57/10.—W. H. Cox, 89, Southam Rd., Hall Green, Birmingham. [9007

DOUGLAS, 1915 2¾h.p. model, 2 speeds, no accessories, reduced price £40; 1914 2-speed model, with accessories, £38; another similar model, £36; late 1913 2-speed model, £32.—Maudes', 100, Gt. Portland St., London, W.1. [9046

RIDER TROWARD and Co., 31, High St., Hampstead.—Douglas, 1914, T.T., 2-speed, 34 gns.; 1915 T.T., 2-speed, re-enamelled, 39 gns.; Douglas, 1913, T.T., 2-speed, 29 gns.; 1911, 2-speed, 18 gns.; 1911, single speed, 13 gns. [9076

Enfield.

1915 Enfield, 2-stroke, guaranteed as new, and not done 1,500 miles; £39.—Missin, Cottingham, Hull. [X9005

3h.p. Royal Enfield, 2-speed, kick start, 1914, £31/10; 1915 model, 3h.p., £45.—Wauchope's, 9, Shoe Lane, London. [9016

ENFIELD Twin Lightweight, chain drive, smart machine; seen running; £14/10.—1, Gunnersbury Lane, Acton. [8976

ROYAL Enfield, 1912, 2¾h.p., chain drive, 2-speed, lamps, new chain, overhauled; £15.—1, Campbell Rd., West Croydon. [8988

3h.p. 1914 Twin-cyl. Royal Enfield, in nice condition and good appearance; 30 gns.—Wauchope's, 9, Shoe Lane, London. [9029

1917 Enfield and Sidecar, 3h.p., lamps, horn, as new; £60.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0479

1913 Enfield Combination, speedometer, new electric lighting set, new tyres; inspection invited; £40, no offers.—Aylott, New Malden. [9045

3h.p. Enfield Combination, hood, screen, speedometer, lamps, mechanical horn, in new condition; £80.—Oram, Colin Park, The Hyde, Hendon. [8974

ENFIELD Motor Cycle, 1917, twin engine, horn, pump, speedometer, etc., in practically new condition; £75; seen by appointment.—Shaw, Porter, and Co., Tidworth, Hants. [8961

LATE 1916 3h.p. Twin Enfield Combination, for solo, done about 500 miles, in perfect condition; £45, or near offer; seen any evening.—Browne, 29, Haldane Rd., East Ham, E.6. [8894

ENFIELD 1916 6h.p. Sidecar Combination, complete, just overhauled, £48; H.F. Multi-tube vulcaniser, 6 pressed complete with plates, fitted for gas, £4/10.—Cole, Ltd., Market St., Guildford. [8940

ENFIELD Combinations from £40, bargain; eight combinations to select from, including dynamo lighting combination, 1914, 1915, 1916, and 1917 models.—Wauchope's, 9, Shoe Lane, Fleet St., London. [9031

ENFIELD Combination, 1916 model, 6h.p., Lucas dynamo lighting outfit, wind screen and hood, perfect condition throughout; also 1916 6h.p. combination, standard model.—Parker's, Bradshawgate, Bolton. [X9021

ENFIELD 1914 6h.p. Combination, 2 speeds, and handle starting, £60; 1916 6h.p. combination, splendid mechanically, but rather poor in outward appearance; great bargain, £68.—Maudes', 100, Gt. Portland St., London, W.1, are buyers of 1916 and 1917 Enfield combinations for cash. [9047

F.N.

RIDER TROWARD and Co., 31, High St., Hampstead.—F.N., 1913, 5-6h.p., 2-speed, clutch; 27 gns. [9077

Harley-Davidson.

1917 Harley-Davidson Combination, electric model; £110.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480

1915 Harley-Davidson Solo Mount: exchange modern combination.—Pewber, Haws Hill Cottages, Holyport, Maidenhead, Berks. [8959

HARLEY-DAVIDSON, 1917 dynamo model, complete to usual specification, £128; ditto, mag. model, in excellent condition, £125; 1915 4½h.p. model, 2 speeds, with wicker sidecar, £32.—Maudes', 100, Gt. Portland St., London, W.1. 1917 Harley-Davidson combinations bought for cash. [9048

RIDER TROWARD and Co., 31, High St., Hampstead.—Harley-Davidson, 1915, 7-9h.p., 3-speed, dynamo lighting, disc wheels, hand and foot clutch, T.T. bars, kick start, just completely overhauled by makers and re-enamelled khaki, 69 gns.; Harley-Davidson, 1915, 7-9h.p., 3-speed, dynamo lighting combination, just overhauled by makers, 72 gns. [9079

MOTOR CYCLES FOR SALE.

Henderson.

HENDERSON, 10h.p., 4-cyl., 1915 model, complete with sidecar, lamps, etc., a splendid combination; £87/10; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [8738

HENDERSON, 1915, short wheelbase, complete with coach sidecar, the whole outfit has just been overhauled and is like new; guaranteed; exchanges considered; 89 gns.—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9114

Humber.

RIDER TROWARD and Co., 31, High St., Hampstead.—Humber, 1913, 3½h.p., 2-speed, clutch, handle start, 24 gns.; ditto, 1911, 18 gns.; Humber, 1914, 2h.p. lightweight, 15 gns. [9078

HUMBER, genuine 1917 6h.p. water-cooled model, 3 speeds, handle starting, with Humber coachbuilt sidecar and all accessories, not done 1,000 miles; £84—Maudes', 100, Gt. Portland St., London, W.1. [9049

Indian.

1915 7-9h.p. Indian, clutch model, new condition; £38.—86, High Rd., Lee. [8913

INDIAN Combination, Powerplus, 1916, looks like new, very fast engine; 85 gns.—123, Queen's Rd., Finsbury Park, N.4. [8918

5-6h.p. Indian, perfect condition, just overhauled, new handle-bars, and tyres like new; £42.—Box 2,356, c/o *The Motor Cycle*. [X8998

1915 Indian Combination, 5h.p., lamps, horn, low mileage; £50.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0600

7-9h.p. Powerplus Indian, 3-speed model, semi T.T. bars, fully equipped with speedometer, lamps, etc.; also another out of order, £10.—Wauchope's, 9, Shoe Lane, London. [9019

INDIAN Combination, 7-9h.p., fitted with electric horn and spares, speedometer, lamps, tools, and accessories, mileage under 5,000; price £80.—Write, Hardesty, 68, Mawson Rd., Cambridge. [8770

INDIAN 7-9h.p. 1916 Powerplus Combination, De Luxe sidecar, magneto, dynamo electric lighting outfit complete, 3 lamps, electric horn, speedometer, 3 speeds, hand and foot clutch, special leg mud screens, in perfect running condition, mileage approximately 5,500, tyres good order; trial Hereford; price £80, or near offer.—Box 2,350, c/o *The Motor Cycle*. [X8970

RIDER TROWARD and Co., 31, High St., Hampstead.—Indian Powerplus, 1916, 3-speed model, unscratched, 72 gns.; Indian, 1915, 7-9h.p., 3-speed coachbuilt combination, 59 gns.; Indian, 1914, 7-9h.p., 2-speed, coachbuilt combination, 52 gns.; Indian, 1915, T.T., clutch, 7-9h.p., 37 gns.; Indian, 1914, 7-9h.p., 2-speed, spring frame, 35 gns.; Indian, 1914, 7-9h.p., T.T., clutch, 29 gns. [9080

James.

JAMES, 4¼h.p., 3-speed, not done 4,000; 48 gns.—54, Ashurst Rd., Croydon. [8892

1914 James Canoelet Combination, 4¼h.p., 3-speed, kick starter, all-chain drive, splendid condition; £44; exchange.—136, Lavenham Rd., Southfields, S.W.18. [8985

JAMES Combination, 1913 model, 3-speed, £47/10; also a 1914 model, 50 gns.; and a solo, 3½h.p. twin, 3-speed, at £45.—Wauchope's, 9, Shoe Lane, London. [9032

RIDER TROWARD and Co., 31, High St., Hampstead.—James, 1914, 4¼h.p., 3-speed, renovated, 34 gns.; James, 1914, 4¼h.p., single speed, re-enamelled, 29 gns.; James, 1917, 2-speed, 2-stroke, 32 gns. [9081

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J.A.P.

J.A.P. 10h.p. Twin, overhead valves; £45.—Wauchope's, 9, Shoe Lane, London. [9034

Kerry

1914 Kerry-Abingdon Combination, underslung sporting sidecar; bargain, £44.—86, High Rd., Lee. [8908

RIDER TROWARD and Co., 31, High St., Hampstead.—Kerry-Abingdon, 1914, 4h.p., single speed, 22 gns. [9082

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1915 (late) Lea-Francis, 3½h.p., 3-speed, lamps, horn, speedometer, as new; £60.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

Levis.

2½h.p. Levis, 2 speeds; £25.—Wauchope's, 9, Shoe Lane, London. [9033

LEVIS, 1915 model, 2¼h.p., first-class condition, £22.—Hopkins, New St., Ledbury. [X7264

RIDER TROWARD and Co., 31, High St., Hampstead.—Levis 1915 Popular; 19 gns. [9083

LEVIS 2-stroke Motor Cycle; £24.—Thwaites, 55 High St., Cleator Moor, Cumberland. [9011

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MATCHLESS, 1918, 8 h.p., standard war model	£125
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LEVIS, 1916, 2¼h.p., very little used, like new; £27/10.—Dakin, 29, Bolan St., Battersea, S.W.11. [8989

LEVIS, 1917 model, new machine, slightly shop-soiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St., Ledbury. [X7263

1917 2¼h.p. Levis, little used, horn, speedometer, etc., as new; owner bought combination; 28 gns.—Loyd, 1, Ovington Gardens, London. [8922

Lincoln-Elk

RIDER TROWARD and Co., 31, High St., Hampstead.—Lincoln-Elk, 1913, 3½h.p., variable gear, waterproof Bosch; 19 gns. [9084

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1917 Matchless Combination, M.A.G., spare wheel, screen, electric lights, oversize tyres, splendid condition; £120.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

MATCHLESS Military 8h.p. Combination, complete with spare wheel; delivery from stock.—Parker's, Bradshawgate, Bolton. [X9020

MATCHLESS War Model Combination, with spare wheel and tyre; £125; trade enquiry entertained; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [X7986

MATCHLESS, 1914, 8-10h.p. J.A.P., Binks, Bosch, 2-speed, coachbuilt sidecar, screen, grid, lamps, accessories, spares, splendid order; a bargain, £65.—Lindsay, Rochlea, Johnstone. [X8994

MATCHLESS 1918 War Model Combination, with spare wheel and tyre, slightly soiled; reduced to £119; seen any time.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

MATCHLESS Combination, delivered from works Oct., 1917, 8h.p. J.A.P. engine, very little used, hood and screen, spare wheel, lighting outfit, perfect condition; price £125; seen by appointment.—Potts, Homefield, Sutton-at-Hone, Kent. [8896

MATCHLESS, absolutely new combination, from stock, £125; also nearly new M.A.G. model, all lamps, speedometer, horn, Palmer cord tyres, hood and screen, spare wheel, a splendid outfit, £145; extended payments or exchange.—Service Co., 292, High Holborn, London. [8733

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MATCHLESS.—Early deliveries of 8h.p. J.A. model combination, spare wheel; £125; exc arranged. Now booking post-war deliveries.—M 100, Gt. Portland St., London, W.1.

MATCHLESS War Office Combination, 8h.p. twin, in perfect condition, and in daily use wheel, all interchangeable, all tools, etc., electric and many improvements, tyres perfect; £115 trial or examination.—Barker, 19, Rookfield Av. well Hill, London. [

A 7-9h.p. Matchless Motor Cycle, with twin and coachbuilt sidecar, will be offered for s auction by Messrs. Rogers, Chapman, and T at their Auction Rooms, 125, Gloucester Road, Kensington, S.W.7, on Thursday, 24th October, o'clock. On view day previous and morning of For catalogues and full particulars apply to th tioneers at their offices, 78, Gloucester Rd., Soutl sington, S.W.7.

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RIDER TROWARD and Co., 31, High St., stead.—New Hudson, 1915, big six coachbuil bination; 52 gns.

NEW Hudson, J.A.P. engine, 4h.p., 3-speed, coachbuilt sidecar, perfect condition; any £38.—Lonsdale, Abermaw, Bath Rd., Dartford.

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4h.p. Norton and Sidecar, 3-speed countershaft and coachbuilt sidecar, £65; also n T.T. Norton, £40.—Wauchope's, 9, Shoe Lane, Lond

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NORTON, late 1916, 3½h.p., T.T., 3-speed co shaft, faultless condition; £70; lightweight exchange.—Lt. Rawlings, Coulsdon, King Charles Surbiton Hill.

BIG 4 Norton 1915-16 Combination, 3-speed co shaft, all-chain drive, new 3in. extra heavy lops, accessories, excellent condition, splendid ru order, machine laid up since September, 1917; Lindsay, Moorfield House, Kilmarnock. [X

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RIDER TROWARD and Co., 31, High St., H stead.—N.S.U., 1913, 3h.p. twin, 2-speed, el 19 gns.

N.S.U., 2¾h.p., 2-speed and free engine, lamps, in excellent running order; £16.—C.H., Beaconsfield Rd., Southall, Middlesex.

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RIDER TROWARD and Co., 31, High St., Hampstead.—Premier, 1914, 3½h.p., 3-speed combination, 35 gns.; Premier, 1914, 3½h.p., 3-speed, 29 gns.; Premier, 1914, 3½h.p., 2-speed countershaft, 29 gns.; Premier, 1913, 3½h.p., 2-speed, clutch, 24 gns.; Premier, 1913, 2½h.p., clutch, 18 gns. [9089

Quadrant.

RIDER TROWARD and Co., 31, High St., Hampstead.—Quadrant, 1913, 3½h.p., 2-speed, clutch, re-enamelled, 29 gns.; Quadrant, 1913, 3½h.p., 3-speed, clutch, 26 gns. [9090

QUADRANT, 4¼h.p., 1913, 3-speed hub, complete with sidecar, hood, screen, and apron, £35; machine only, £25; E.P., or exchange.—Service Co., 292, High Holborn, London, W.C.1. [8734

Rex

REX and Sidecar; 10 gns.—Wauchope's, 9, Shoe Lane, London. [9038

1913 6h.p. Rex Combination, Roc 2-speed, wants silencer; £23.—Missin, Cottingham, Hull. [X9006

A REAL Snip; must sell.—6h.p. Rex, o.h.v., special engine, very fast, 50 m.p.h., just spent £11, new tyres, lamps, etc., perfect; £25, offers.—Box L7,485, c/o *The Motor Cycle*. [9061

6h.p. Rex Combination, latest model, 3-speed gear box, hand controlled clutch, kick start, enclosed chain drive, large underslung coach sidecar with luggage grid, lamps, and all accessories; appointment.—86, Hamilton Rd., Wimbledon. [8955

Rover.

1914 3-speed Rover, very nice condition; £36.—Ross, 86, High Rd., Lee. [8911

ROVER, 3½h.p. 1917 model, 3-speed, free engine, done 1,200 miles, as new, lamps, tools.—Apply, Box 2,557, c/o *The Motor Cycle*. [X9015

ROVER Combination, 1914, 3½h.p., 3-speed, Bosch B.B., condition excellent, sidecar coachbuilt, nice turnout; £38.—13, Birchwood Rd., West Byfleet. [8980

ROVER Combination, 1917 (December), less 1,000 miles, absolutely unscratched, 3 lamps, horn, tools; cost £112, accept £69.—34, Cook Rd., Ward End, Birmingham. [X8985

ROVER 1917 3½h.p. Combination, all lamps, mechanical horn, speedometer, sporting sidecar, condition like new; bargain, £72. 'Mandes', 100, Gt Portland St., London, W.1. [9051

1915 3½h.p. 3-speed Rover Combination, Jones M.H. speedometer, 3 lamp sets, horn, mirror, luggage grid, Pillion seat, spare cover, run on paraffin, various improvements, perfect throughout, mileage 3,680, mechanic owner; £60, or exchange 1916 Powerplus or Harley combination, cash adjustment; appointment or photo.—21, Nimrod Rd., Streatham. [8929

Royal Ruby.

ROYAL Ruby, 2-stroke, 1914, perfect; £16.—Wells, Central Garage, Woodford Green. [9005

RIDER TROWARD and Co., 31, High St., Hampstead.—Royal Ruby, 1916, 2½h.p. Villiers engine, re-enamelled; 22 gns. [9091

Rudge.

1914 5-6h.p. Rudge Multi, thoroughly overhauled by makers, £42; with new Bramble sidecar £53.—12, Dukes Rd., Tavistock Sq., W.C.1. Central 5604. [8953

3½h.p. Rudge Multi and Coachbuilt Sidecar, new extra heavy tyres, good appearance; £35; good lightweight and cash considered in exchange.—58, Malvern Rd., Dalston. [8993

RUDGE Multi, fitted with Mills-Fulford de Luxe sidecar, little used, 1913, £38, or nearest offer; motor suit, new, 37 6, bargain.—Heppenstall, 86, Beotherry Rd., Goole. [X8976

3½h.p. Rudge Cylinder, silencer, oil tank, crank case, pair flywheels with connecting rod, foot pump, generator, etc.; 25/- lot.—Sticker, Photographer, 49 High St., Kingston, Surrey. [X9030

RUDGE Multi, 1916 standard, h.b.c. clutch, Binks carburetter, speedometer, 2 lamps, new back tyre, horn, and mmup, just been overhauled under priority permit; £45.—Isley, Harston, Cambs. [8788

RUDGE, 1913, T.T. model, Philipson pulley, just been re-enamelled and plated; guaranteed; exchanges considered; 29 gns. (16).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9110

RIDER TROWARD and Co., 31, High St., Hampstead.—Rudge Multi, brand new 1917, 3½h.p., standard model, 62 gns.; Rudge Multi, 1914, 3½h.p., standard, re-enamelled, 36 gns.; Rudge Multi, 1913, 3½h.p., standard, 27 gns.; Rudge, 5-6h.p., 1915, 3-speed, re-enamelled, 39 gns.; sidecars from 4 gns. to suit above. [9096

Scott.

1914 Scott, complete lamps, horn, numbers, etc.; £39.—Cross, Jeweller, Rotherham. [X9010

RIDER TROWARD and Co., 31, High St., Hampstead.—Scott, 1914, 3½h.p., 2-speed, clutch, kick start; 32 gns. [9092

1915-16 T.T. Model Scott, 2-speed, clutch, kick start, Binks carburetter, only done 2,000 miles, in excellent condition, complete with all accessories, tools spares; a snip at £50.—9, Alexandra Rd., Abertillery, Mon. [X8977

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RIDER TROWARD and Co., 31, High St., Hampstead.—Singer, 1914, 2½h.p. clutch pedal start, lightweight; 18 gns. [9093

SINGER and Sidecar, 1913 (late), 2-speed countershaft and clutch, Burberry coach sidecar, guaranteed; exchanges; 33 gns. (26).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9120

Sun

RIDER TROWARD and Co., 31, High St., Hampstead.—Sun-Villiers, 1915, single speed, 2-stroke; 16 gns. [9095

SUN 2-stroke, 2-speed, Villiers engine, 1915; exchanges considered; 26 gns. 13.—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9109

Sunbeam.

SUNBEAM 1914 3½h.p. Combination; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9102

23h.p. Sunbeam, 1914, with accessories, in excellent running order; £35, no offers.—Edwards, Roseleigh, Axminster. [X8996

1916 Sunbeam and Sidecar, 3½h.p., lamps, horn; bargain, £75.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

SUNBEAM Cycle, with Auto-Wheel attached, oil bath, 3-speed gear, 24in. frame, in good condition; £23.—Missin, Cottingham, Hull. [X9007

SUNBEAM 1914 3½h.p. Combination, 3 speeds, kick start, coachbuilt sidecar, just overhauled; £64.—Mandes', 100, Gt. Portland St., London, W.1. [9052

1916 3½h.p. Sunbeam, with Mills-Fulford coachbuilt sidecar, in perfect mechanical condition, black and gold finish; £82/10.—Robinson's Garage, Green St., Cambridge. [9067

RIDER TROWARD and Co., 31, High St., Hampstead.—Sunbeam, 1916, T.T., 5½h.p., 3-speed, disc wheels, leg shields, long exhaust, many extras, 72 gns.; Sunbeam, 6h.p., 3-speed, Gloria No. 1 sidecar, 85 gns. [9094

SUNBEAM, 3½h.p., latest 1918 model, black and gold finish, run few miles only, indistinguishable from new, fitted with brand new Gloria sidecar, luxurious finish black and gold, spares include large head lamp set, rear lamp set, Lucas horn, speedometer, spare tube, tools, sundries; can be purchased without permit; £120; will sell machine only; offers invited.—Parker's, Bradshawgate, Bolton. [X9019

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Torpedo

TORPEDO-PRECISION, 2¾h.p., hand clutch, m.o.v., B.B., only wants seeing; bargain, £9. Bull, 22 Tintern Rd., Wood Green, N.22. [8974

TORPEDO Coach Combination, 4½h.p. twin, 3-speed Sturmey, Sensprite, Dunlops, 3 lamps, mechanical horn, all in excellent condition; 50 gns. Grant, 11 Barnett, 121, Oxford Rd., Walthamstow. [8691

Triumph.

1914 Triumph, 4h.p., 3-speed, full accessories; £37. 86, High Rd., Lee. [8912

TRIUMPH, N.S.U. gear, sidecar, lamps, smart, powerful; £25, offer.—24, Beauval Rd., East Dulwich. [8970

TRIUMPH.—Three combershaft models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9103

TRIUMPH, 2-stroke, complete with accessories, in new condition; £40, or near offer.—Box L7,375, c/o *The Motor Cycle*. [8791

TRIUMPH, clutch model, 1912-13, lamp set, horn, good running order; £25.—Goss, 71, South Side, Clapham Common, S.W.4. 'Phone: Brixton 322. [9007

3½h.p. Triumph and Sidecar, 1913 model, 3-speed gear, and free engine, the combination ready for the road; £30.—Wauchope's, 9, Shoe Lane, London. [9017

TRIUMPH, 3-speed, clutch, and multi pulley, coach sidecar, screen, and hood, engine, tyres, and whole outfit in excellent condition, foot or hand start, Sensprav carburetter.—S., Kenilworth, Burston Rd., Putney, S.W. [8930

TRIUMPH Junior, 1915, Lucas lamps, generators, and horn, Dunlop tyres and belt, excellent condition, carefully ridden, and not used since September, 1917; £35, or near offer.—Write, Salt, 38, Holywell St., Chesterfield. [X8014

TRIUMPH, 1911, 3½h.p., excellent condition, not used since 1916, 2-speed, new back Dunlop tyre, 1916 B.B. carburetter, lamps, speedometer 'Jones', all accessories, including spare valves, Hutchinson tyre, etc.; £24.—Morgan, 39, Rochester Av., Rochester, Kent. [8967

RIDER TROWARD and Co., 31, High St., Hampstead.—Triumph, 1913, 3½h.p., 3-speed coachbuilt combination, 34 gns.; Triumph, 1913, T.T., clutch, 24 gns.; Triumph, 1911, 3½h.p., 2-speed, clutch, 17 gns.; Triumph, 1911, 3½h.p., standard, 13 gns.; sidecars from 4 gns. for above. [9097

Velocette

RIDER TROWARD and Co., 31, High St., Hampstead.—Veloce, 1915, 2½h.p., 2-speed; 25 gns. [9098

VELOCETTE, lady's model, 2-stroke, 2-speed, dropped frame, perfect order, guaranteed; exchanges; 24 gns. (19).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9112

Williamson

RIDER TROWARD and Co., 31, High St., Hampstead.—Williamson, 1915, 8-10h.p., 2-speed, underslung coachbuilt Williamson sidecar; 65 gns. [9100

1914 8h.p. Water-cooled 2-speed Williamson and underslung coachbuilt sidecar, in perfect running order and condition; £60, no offer accepted.—Brown, 105, Foleshill Rd., Coventry. [X8794

Wolf.

WOLF J.A.P., 2½h.p., 2-speed, kick start and clutch, just returned from enamellers and platers, in perfect condition and looks as new; 29 gns.; exchanges considered; guaranteed 25.—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9119

Wooler.

RIDER TROWARD and Co., 31, High St., Hampstead.—Wooler, 2½h.p., 2-speed, spring frame, 2-stroke, re-enamelled; 26 gns. [9099

Zenith

1915 5h.p. Countershaft Zenith Combination; bargain, £52.—86, High Rd., Lee. [8915

8h.p. Zenith Combination, countershaft, good condition; £52.—Wilson, Bramshill, Eversley, Hants. [8502

ZENITH.—Several models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9104

ZENITH Motor Cycle, 3-11h.p., 1916-17, variable gear, in good condition, not done 500 miles; £75.—Ralph, Bathurst Mews, Sussex Sq., W.2. [8899

1913-1914 Zenith-Gradua 5-6h.p. Twin Coachbuilt Combination, countershaft clutch and K.S., good tyres, £5 spent last month on overhaul of engine, etc., in use at present time; owner buying car; £39.—Lieut. Oliver, 5th Notts and Derby, Saltfleet, North Somercotes, Lincs. [X8916

RIDER TROWARD and Co., 31, High St., Hampstead.—Zenith-Gradua, 1912, 3½h.p., 21 gns.; 1913 3½h.p., 26 gns.; 1914 3½h.p., re-enamelled, 32 gns.; 1915 3½h.p., re-enamelled, 36 gns.; 1915 4-5h.p. twin, re-enamelled, 42 gns. [9101

ZENITH-GRADUA, 1914, 3½h.p., T.T. model, in good running order and guaranteed; exchanges; 29 gns. (22).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9118

MOTOR CYCLES FOR SALE.

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ZENITH Combination, 1914, 6h.p., coach sidecar, in perfect order, just overhauled, guaranteed; exchange considered; 49 gns. (8).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage Stations). 'Phone: Hampstead 4631. [9108

ZENITH-GRADUA, 3½h.p. single, perfect condition, and complete with lamps and horn; guaranteed; exchanges considered; 33 gns. (24).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9116

ZENITH 6h.p. Twin, 1914, T.T., just been re-enamelled and plated and completely overhauled, looks like new, and is guaranteed; 39 gns.; exchanges considered (23).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9117

ZENITH-GREEN-PRECISION, 4h.p., water-cooled Gradua gear, and Mills-Fulford sidecar, first-class condition, disc wheels, P.R.S. head lamp, all accessories, exceedingly powerful, ready to drive away; send for photograph; first cheque for £45; appointment week-end for trial.—Box L7,472, c/o *The Motor Cycle*. [8939

Miscellaneous.

BARGAIN.—4h.p. 3-speed combination, little used; £20.—15, Holden Park Rd., Southborough. [9000

3½h.p. Motor Cycle, good running order, Bosch mag., 32 tyres good; £8.—Evans, Hatton Rd., Bedfont, Middlesex. [8917

RUDGE, 3½h.p., free engine, in splendid order, £25; 3h.p. Royal Enfield, in splendid order, £28; Alldays Matchless, 2-stroke, £16.—Britnell Bros., 45, High St., Fulham, S.W. [9009

MOTOR Cycle and Coachbuilt Sidecar for sale, fitted with 2-speed gear box, good machine, good tyres; any trial; will exchange for 2-stroke.—W. Mardell, Dudenhoe End, Elmdon, Essex. [X8918

NOW or Never.—1915 Allon, 2 speeds, clutch, £30; 8h.p. Powerplus Indian and sidecar, £65; 1912 5½h.p. Premier, N.S.U. gear, £20; stamp for particulars.—Farrar, 19, Hopwood Lane, Halifax. [8880

BARGAINS.—1914 3¼-4h.p. Singer, 2-speed countershaft, £29/10; 1915 Ivy 2-stroke, £18/10; 1913 Douglas, 2 speeds, £23; 1910 Triumph, £18; 1914 Sun-Villiers, £13; 1912 3½h.p. Ariel, T.T., R.F.C. bars, tuned up perfectly by R.F.C. officer (recently killed), £24.—J. J. W. Pater, 46, Ampthill Rd., Bedford. [8900

JONES' Garage have in stock Ariels, B.S.A.'s, Douglases, new 1918 Matchless, Allons, new O.K.-J.A.P.'s, Indians, Levis, Triumphs, Rovers, Enfields, A.J.S., Zeniths, new Dalm 2-strokes, etc., etc.; send for list; cash, exchanges, or deferred payments. See next week's adverts.—1, The Broadway, Muswell Hill. 'Phone: Hornsey 2562. [0961

SPECIAL Bargains.—2¾h.p. Enfield, 2 speeds, £18/10; 2½h.p. Calthorpe-Jap, 1915, Enfield gear, £22/10; 2h.p. N.S.U. lightweight, 2 speeds, £10/5; 3½h.p. Humber, 1913, 2 speeds, £25/5; 2¾h.p. Allon, 1916, 2 speeds, clutch, £35/5; 6h.p. 1913 Rudge Multi gear, big single, £29/15; 6h.p. 1911 Rex, £11/15; 3½h.p. Rex, 1910, low built, £11/15; 3½h.p. 1911 Humber, 2 speeds, £18/15; 2¾h.p. T.D.C. De Luxe, £15/15; send stamp for detailed list.—Booths Motories, Portland Place, Halifax. 'Phone: 1062. [8494

£10 to £20 purchases any of the undermentioned machines, all of which are guaranteed in running order: Minerva, 3½h.p., 9 gns.; Douglas, 1911, 2 gns.; F.N., 4-cyl., 13 gns.; Triumph, 1911, 3½h.p., 13 gns.; Bradbury, 1912, 3½h.p., 2-speed, clutch, 19 gns.; Douglas, 1911, 2-speed, 17 gns.; Grandex-Precision, 1913, 3½h.p., 2-speed, clutch, 19 gns.; Lincoln-Elk, 1913, 3½h.p., variable gear, waterproof Bosch, 19 gns.; Sun-Villiers, 2-stroke, 17 gns.; Singer, 1914, 2½h.p., T.T., clutch, 18 gns.; Humber, 1914 2½h.p., lightweight, 16 gns.; Triumph, 1911, 3½h.p., 2-speed, clutch, 17 gns.; Wolf, 1915, single-speed 2-stroke, 19 gns.; Humber, 1911, 3½h.p., 2-speed, handle start, 19 gns.; Quadrant, 1910, 3½h.p., mag., 11 gns. Full details on request.—Rider Troward and Co., 31, High St., Hampstead. [8620

BARGAINS; cash offers considered.—1915 A.J.S. combination, £79/10; 1913 3½h.p. 3-speed Bradbury, £29/10; 6h.p. 2-speed Clyno and sidecar, wants attention, £19 19; 1914 2-speed Douglas, £34/10; 1916 8h.p. Enfield combination, speedometer, etc., £82/10; 7-9h.p. twin Indian, £23/10; 1914 7-9h.p. Indian and sidecar, £49/10; 1914 Lincoln-Elk and sidecar, £49/10; 3½h.p. N.S.U. and new couch sidecar, £26/10; 3½h.p. Roach, 2 speeds and free engine, and new 1918 coach sidecar, £24/10; 5-6h.p. Rudge Multi and sidecar, £45; 5½h.p. Tourist Rex, £12/10; 2¾h.p. 3-speed Rex, £22/10; 2-speed twin Rex, £18/10; twin m.o.v. Rex, £14/10; 3½h.p. Triumph, £18; 2½h.p. 2-speed Lloyd's-Villiers, £25/10; 1915 2-speed Radco, 2-stroke, £22/10; Perry 2-seater, £125; 1914 9.5h.p. Stellite, 195 gns.—Halifax Motor Exchange (new address), 18a, Union St. South, Halifax. [8946

SIDECAR ATTACHMENTS.

WILLIAMSON Cab, new; £20.—Wauchope's, 9, Shoe Lane, London. [9040a

1917 Phœnix, coachbuilt, as new, disc wheel; £7/10 —86, Townsend Rd., Southall. [8923

NEW B.S.A. No. 2 Sidecars from stock.—Wauchope's, 9, Shoe Lane, London. [9040

HENDERSON Lightweight Sidecar, coachbuilt body, quick detachable joints, in new condition; £10.—Apply, Haynes, Eastwood, near Ledbury, Herefordshire. [X8948

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LEVIS, 2½ h.p., 2-speed, 2-stroke **£47/10**

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***LEVIS** Popular, 2-stroke .. **£32 0**

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ROVER, 3½ h.p., 3-speed **£80 0**

* Permit required for this machine.

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Biggest Light Car and Motor Cycle Dealer in the South.

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FORWARD Coachbuilt Sidecar, new Clincher studded tyre, 4-point attachment, £4/10; British standard coachbuilt sidecar, 4-point attachment, £4/4; Beacon wicker sidecar, almost new, £3/5; roomy 2-seater cane body, fits Enfield chassis, 15/-; sidecar stands, kick-up model, 4/-, post free.—Farrar's Motories, Hopwood Lane, Halifax. [8881

RENNOC Sidecars are manufactured at the Rennoc Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4.

RENNOC Sidecars are designed and manufactured under the personal supervision of Mr. George Conner, 14 years manager to the Phœnix Sidecar Co.

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SIDECARS.—New James canoelet, £18/18; new sidecars complete from £12/12, or chassis and bodies separate; or by extended payments.—Service Co., 292, High Holborn, W.C.1. [8748

TORPEDO-SHAPED Sidecar, as new, brand new tyre, disc wheel, finished khaki, £12/10; torredo wicker sidecar, very good condition and strong, £5.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0623

HOODS, WIND SCREENS, ETC.

ORTO Wind Screens, the high water mark of design, efficiency, quality, and workmanship; "Ortomatic" in action.—Atkinson's, 306, Uxbridge Rd., W. [8143

RENNOC Motor Sidecar and Engineering Works certainly lead in price, quality, and design of hoods, screens, aprons, etc.—86, Victoria Rd., Stroud Green, London, N.4. [7434

WIND Screens.—The Standard, 27/6; folding top, 32/6; double side wing screen, 45/-; the Fitall, 28/6; the fixed, 24/-; the Orto, 33/-, 55/-, and 60/-; Bluemels, 42/-; the Walbro, 36/-; fawn waterproof hoods, with strong wood frames and plated fittings, 42/-, 48/-, and 60/-.—Juno Showrooms, 248, Bishopsgate, London. [8945

BODIES.

CANE Sidecar Bodies.—Several to clear at 50/- each, worth £5. Write for design.—The Willowbrook Co., Leicester. [5901

RENNOC Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4, are actual Manufacturers, also have new clearance and second-hand. [7425

BASTONE'S for Sidecar Bodies.—Several light wicker and coachbuilt bodies; also tandem and torpedo bodies at clearance prices.—226, Pentonville Rd., King's Cross, London, N.1. [9044

SIDECAR Body Designs for the trade only. Working, coloured, pencil, or line drawings of original designs, also working drawings full sized or to scale.—Cooper's Vehicle Journal, Ltd., established designers to the coach trade for over 80 years. Consult us when designing new ideas.—20, Tudor St., London, E.C.4. [0818

SIDE-CARRIERS AND PARCEL-CARS.

4½h.p. B.S.A. Tradesman's Combination, fitted with a new Canoelet tradesman's square box on side chassis, covered in, large and roomy; £75.—Wauchope's, 9, Shoe Lane, London. [9041

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WE have several Grand Prix Morgans in stock at the present time. Write for full particulars.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0688

MORGAN Runabout, 1916, 8-10h.p., disc wheels, hood, screen, lamps, pump, painted black, good condition; price £95.—Housden, 10, Robert Rd., High Wycombe. [X8450

MAUDES'.—We have a stock of seven Morgans, air and water-cooled models, 1913-1916. Full particulars on request.—Maudes', 100, Gt. Portland St., London, W.1 [9055

MORGAN, 1917 De Luxe model, complete with hood, screen, C.A.V. dynamo, electric lighting outfit and 5 lamps, absolutely new condition throughout; £150.—Hopkins, New St., Ledbury. [X7261

CARDEN Monocar, 1915, 2-speed De Luxe, 6h.p., 55 gns.; Morgan, sporting model, red finish, 68 gns.; Morgan, 1914, 8-10h.p. air-cooled J.A.P., disc wheels, hood, screen, 77 gns.; Morgan, 1914, Grand Prix, water-cooled J.A.P., disc wheels, hood, screen, 95 gns.; Morgan, 1915 Grand Prix, water-cooled J.A.P., disc wheels, 115 gns.—Rider Troward and Co., 31, High St., Hampstead. [8621

CARS FOR SALE.

SWIFT Light Car, 1914, fully equipped; £114.—wheel, fully equipped, handsome light car; £135.

PEACE in Sight!—Then you just watch prices go up. Now is the time to buy, lest very soon nothing decent is obtainable. Remember, many of following cars practically new, and all dates quoted below guaranteed accurate.—Cox, below.

PEACE in Sight!—Consider some of these: 10h.p. Unique parcels lorry, modern light car type, pointed radiator, wire wheels, watertight mag., £50; 15-20h.p. K.R.I.T. torpedo, monobloc, gate, Claudel, Bosch, detachables, £65; 15h.p. racing car, as real Brooklands winner, 70 m.p.h., skeleton 2-seater, £75; 15h.p. Charron chassis, 4-cyl. monobloc, cardan, £80; 14-16h.p. Darracq traveller's omnibus, monobloc, gate, Zenith, £85; 8-10h.p. Alldays Midget, Zenith, smart, £90.—Cox, below.

PEACE in Sight!—Forty bungalow plots on Thames at Sunbury, £100 each, freehold, or let; 2-ton Berliet chassis, twin solids, extra long wheelbase, £100; 13.9h.p. 1912 Darracq 4-seater, monobloc, enclosed valves, Zenith, gate, £100; 8-10h.p. 2-cyl. Renault lorry, platform 7ft. 6in. × 5ft., taxi type chassis, economical, £115; 1914 Lagonda coupe, £120; 38h.p. T.M. Daimler chassis, £125; 30h.p. U.S.A.-National sporting 4-seater, £125; 15h.p. Bayard 1-ton van, solids all round, £125; 12-15h.p. F.I.A.T. taxicab, monobloc, £135.—Cox, below.

PEACE in Sight!—15-25h.p. Panhard live axle chassis, £140; 10h.p. 1916 Horstman sporting light car, streamline 2-seater, disc wheels, 4-cyl. monobloc, self-starter, 40 m.p.g., £145; 11.9h.p. 1916-17 Argo sporting 4-seater, dynamo lighting, self-starter, discs, 3 gn. tax, £145; 2-ton Milnes-Daimler van, twin solids, Bosch, Zenith, £145; 1914-15 Studebaker 15-cwt. van, £150; 10h.p. Calthorpe Minor streamline 2-seater, dickey, monobloc, detachable wheels, fast car, £165; 11.9h.p. Belsize streamline 2-3-seater, dynamo lighting, monobloc, detachables, smart, £185; 28h.p. Wolseley chassis, long wheelbase, detachable wire wheels, £200; 12-22h.p. 1914 Palladium van, about 1 ton, solids all round, monobloc, enclosed valves, £250; 16-20h.p. Sunbeam 5-seater, enclosed valves, 4-speed, detachable wheels, Claudel, Bosch watertight, quite splendidly, £285; magnificent 15-22h.p. R.M.C. interior-drive saloon, 4-seater, dynamo lighting, streamline, monobloc, detachables, particularly smart, £350; 16h.p. Sunbeam streamline torpedo, dynamo lighting, monobloc, enclosed valves, detachable wheels, 4-speed, smart, £385; 3-ton De Dion commercial chassis, latest round-radiator type, worm drive, enclosed valves, Bosch watertight, steel wheels, twin solids, £385.—Below.

DOUGLAS S. COX, the Absolutely Straight Motor Man, has all above actually on view. Please call. Hours 8 to 6.30, including Saturdays. No business Sundays. Established 1902. [9014

OCTOBER 31ST, 1918.

THE MOTOR CYCLE

ESTABLISHED IN 1903

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The Standardised Motor Bicycle.

A CONSIDERABLE amount of interest was displayed some months ago when it was announced that the American Army had decided to employ a standardised motor bicycle for war purposes. The names of the designers called together by the Government to evolve this special machine included the most prominent motor cycle engineers in the U.S.A., and among them was a British—or, rather, Irish—gentleman who is very well-known in the motor cycle world in this country.

Particulars of the machine, which was a combination of some of the best known makes in America, attracted much attention, both in the country of origin and over here, but now we learn that there is every prospect of the idea being abandoned; in fact, the special Committee has actually been disbanded, and we learn that the U.S. Army proposes to make use of certain well-known standard sidecar machines and some medium weights for military purposes in future.

This is following the British practice, and it is very gratifying to realise that England not only leads the way in the manufacture of motor cycles, but that her Army has also acted in the wisest possible manner in adopting a type of motor cycle, the performances of which it has known to be satisfactory, for military purposes, and that our latest Allies have found that this procedure has, in the main, been the right one to follow.

The British Army watched the performances of various motor cycles long before the war, made tests in a quiet and unobtrusive manner of the leading makes of machines, and finally decided on a few of the best, keeping a watchful eye on these, so that when war broke out it would be known just what types were the most satisfactory. As few different makes as possible were chosen, so as to simplify the supply of spare parts, and, as has been proved in this war, the British War Office did the right thing, and, on the whole, the motor cycles supplied have given the greatest possible satisfaction. The Auto Cycle Union did much good in inviting the leading military motor cycle experts to act as prominent officials in its more important trials.

Directional Stability.

IN an interesting article which we publish on another page on the subject of streamlining, our contributor refers to the keel surface of an aeroplane and its influence in maintaining a straight course, but we think that, in applying the same theories to a motor cycle, he is carrying the analogy too far. An aeroplane can, of course, partially rotate about its centre of gravity, but a motor cycle, owing to its wheel contact with the road, cannot do so while running as it should do, but only when it side-slips. Therefore, we cannot agree with that part of the article which suggests that streamlining, by providing extra keel surface behind the centre of gravity, would be, in any way, an aid to directional stability.

It is perfectly true that a motor cycle when meeting a sudden gust of wind from right or left may be blown sideways, but this is not necessarily because the direction of travel is changed by the wind, but because the wind destroys the equilibrium of the machine, and this can only be regained if the rider turns in the direction in which the machine is falling; hence the momentary change in direction. When a motor cycle is running in a calm the centre of gravity must be in the same vertical plane as the points of support, but when a strong side wind is blowing a new force comes into play, which must be counteracted by the machine and rider leaning, as it were, against the wind. Streamlining devices would then present more surface to the breeze, and necessitate a greater inclination from the vertical position, therefore, in this respect, they would be a disadvantage rather than an advantage.

An index to the advertisements in this issue will be found on the page facing the back cover.

The Question of Streamline.

NOTES ON ITS APPLICATION TO MOTOR CYCLES.

THE study of streamline is extremely simple. Any body moving against a current creates a partial vacuum behind it. Imagine a square piece of wood in a stream of water (fig. 1). The particles of water strike the wood, separate, but do not immediately join again behind it. An area of cavitation is formed, and has the effect of tending to drag the wood back. Now place a V-shaped piece of wood, conforming to the shape of the cavitation area, behind the object. At once the cavity is filled up, and the drag due to it ceases. It is important to notice that this cavitation area is *behind* the object. It scarcely matters how the *front* of the wood is shaped: it is the back that does the damage.

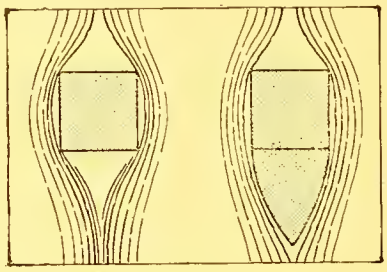


Fig. 1.

The experiment is easy. Take a square of wood, and another piece shaped as suggested. Put them both in a river, the V of the streamline one pointing down stream, and the square piece will be carried down much faster than the other. Now reverse the streamline square, so that the V points upstream. It will then travel nearly as fast as the non-streamlined one. This principle is identical whether we are dealing with a current forcing an object along or forcing its way against a current.

Now these facts, so minutely studied on the aeroplane, and partly made use of in cars, are not applied to the motor cycle. And there is a reason.

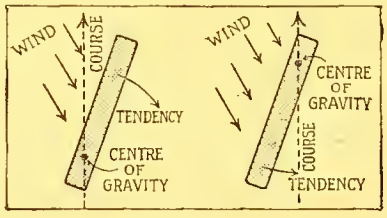


Fig. 2

If we streamlined a motor cycle, we should extend from the back—the "trailing edge"—of all important parts, a V-shaped fairing, of a length depending on the probable speed of the machine. Especially should we streamline the rider, the back wheel and mudguard with one large cone. This would not only add weight—the weight could be trifling—but it would add very much to the surface of the machine as viewed from the side. We are at once told ("Ixion" was quite unkind about it) that the machine would become unmanageable in a side wind.

Directional Stability.

A motor cycle has no directional stability: that is, it has no tendency to return to its original course when temporarily deflected from that course. Directional stability is obtained, briefly, by having more "keel surface" (surface viewed from the side) behind the centre of gravity than in front of it. Consider a side gust striking a motor cycle (fig. 2) and slightly turning it about its centre of gravity. Then if there is more surface for the wind to strike in *front* of that centre than behind, the movement will tend to increase until the machine is turned completely round. Normally, this tendency is corrected by the rider almost unconsciously. Now if there were more keel surface behind the centre than in front, the wind would simply tend to swing it back to its original position. The weathercock acts like this. The weathercock would have a poor chance of always facing the wind if its centre of keel surface were not behind its turning axis.

Keel Surface.

Now a motor cycle is almost devoid of any design at all. It has developed quite casually from the pedal cycle, and it still carries many legacies from its parent. In every case the centre of gravity is behind—as far behind as possible. Nothing terrifies a designer more than the suggestion of moving some of the weight forward. Few designers really object to our putting an extra twelve stone on the carrier. But hint at more weight on the front wheel, and we are told about skids and wet-weather bogies until we feel inclined to take to a bath chair.

I had an old Matchless. It was quite stable for one, but I never cared much about passengers on the carrier: it then became rather difficult to control. Occasionally, however, I took two passengers. Then the heavier would sit in front on the tank, and the other on the carrier, as close up as possible. It was uncomfortable, but it was certainly safe enough. I never had the slightest suspicion of a skid. This, with other experiences, tended to explode for me the idea that all the weight should be on the back wheel.

Now to our streamlining. It will be seen that most of the additional keel surface is added *behind* the centre of gravity. The fairing for the rider and back wheel, in particular, would probably be enough to bring the centre of keel surface behind the centre of rotation, even without moving any weight forward. Hence we should have that hitherto unheard of thing on a motor cycle—directional stability. And so far from being unrideable in a wind, our streamlined machine would be far more stable than before.

I am only a theorist, of an iconoclastic turn of mind. I have never streamlined a motor cycle. Time has been rather short these last four years—and I have waited for someone else to do it. But I feel fairly hopeful of the result.

E. P. BURDETT.

A New Infinitely Variable Gear.

A COLLEAGUE sat in the office through the whole of one day with a rapt, dreamy expression. When we rallied him he suddenly began to effervesce furiously. He had just inspected a new foolproof gear, which is infinitely variable *ad infinitum* both ways, and includes a clutch. It is so delicate in action that you can use it to turn a motor bicycle round in a shed of 7ft. square, and a child of two could operate its control. It appears to be light and durable, and fairly cheap to make. I have struck these ideal gears before, so maintain a stony cynicism until my colleague's lips are wholly unsealed, but whenever I catch him in a smile-wreathed reverie I know what he is thinking of. He is going to bring down a demonstration machine, put me on it, and tell me that the reverse position of the control is the forward. Then I shall start off backwards at umpteen m.p.h. I will see him—bombed first!

"Vedette" on Brakes.

I SHALL be interested to see how many veteran riders disagree with our contributor "Vedette's" prophecy that the internal expanding brake is likely to squeeze the belt-rim shoe type off our motor cycles, or share his preference for the shoe which works inside the rim groove, or endorse his condemnation of the most popular type. I have had a twenty years' gruelling with all kinds of brakes, and the belt rim shoe is the one and only brake I have ever struck which gives practically no trouble, and always grips. In its intrinsic reliability, maintenance of efficiency, and infrequency of adjustments, it has any other type of brake I know beaten to the wide. My colleagues on *The Light Car* were interminably fiddling with their expanding brakes, which seldom provided sufficient power when new, wore down with astounding rapidity, and were quite astonishingly inaccessible and expensive to repair. I see no reason why a similar type of brake should be any better on a motor cycle. The average car owner is very sorry that the propeller-shaft brake is passing out of fashion. The engineers are killing it, because its location subjects the crown and bevel at the back axle to the braking strains: but owners always loved it, because the extra leverage afforded by the final reduction in the back axle endued it with a power which hub brakes seldom boasted. "Vedette's" conclusions may be mechanically sound, but motor manufacturers have a long furrow to hoe before the expanding brake makes a worthy successor to our foolproof, reliable, belt-rim shoes.

To the best of my belief, I have only owned two belt-rim shoes of the types which he applauds, viz., those which work in the V, instead of outside it. I loathed them both. They went on right enough, but it was always a lottery whether they would come off until I dismounted and prised them out of the rim with a tyre lever. I quite admit that comparatively few belt-rim brakes are perfectly designed, and make the best use of their possibilities, but I shall be sorry if they disappear.

Three Epithets.

WHEN you come to think of it, three epithets usually leap to the lips of the ignorant non-riding public, when they attempt polite conversation with an enthusiastic motor cyclist. They are "dangerous," "uncomfortable," and "expensive." It is a mistake to think that these exaggerated and unkindly labels are inspired solely by ignorance and prejudice. They owe something to observation (watch a motor cycle on a rough road, and ask yourself if the rider *looks* comfortable); and something to the reports of quondam riders who have abandoned the sport for divers reasons. We all know that motor cycling is the cheapest form of long-distance travel and speedy travel, unless the rider is a fool. We also know that the man for whom motor cycling is appreciably dangerous is not to be trusted on a push bicycle. But that third epithet, "uncomfortable," is far better justified than we are prepared to admit, and I rub the point in because the day has arrived for the common discomforts of motor cycling to be exorcised by clever designers, irrespective of the state of our roads.

Nothing Doing.

WITH pleasure motoring barred, and precious little petrol available even for stern duty, it is a little hard to produce a weekly column on strictly motor cycling topics, and if the Editor were a little less of a Prussian, I should certainly branch off into discussions anent the local brand of margarine, or my new safety razor, which sizzles deliciously over my chin, like a new non-skid over a frozen road. As it is, I just want to remind the few motor cyclists who are grumbling about war restrictions on the sport and industry, how their discontents strike a soldier. I travelled up to Coventry this week with a couple of Service men, who were just commencing their third leave apiece in nearly four years of war, after fighting in the Far East as well as the West. Both of them had been through Gallipoli, and neither of them seemed to have had his fair share of leave. In over two hours' conversation, neither of them emitted a single fed-uppy sentiment. But one of them let drop a remark which we at home ought to chew. "Rotten place, England, nowadays, what? All the decent men are Overseas. They seem kind of envious of us, because we get well fed over there without any bother. Fancy being *envious* of us! Funny. What?"

Some of the merchants who discharge so much hot air about strangling the motor industry and treating the private motorist unjustly are not worth dying for. They make one's gorge rise.

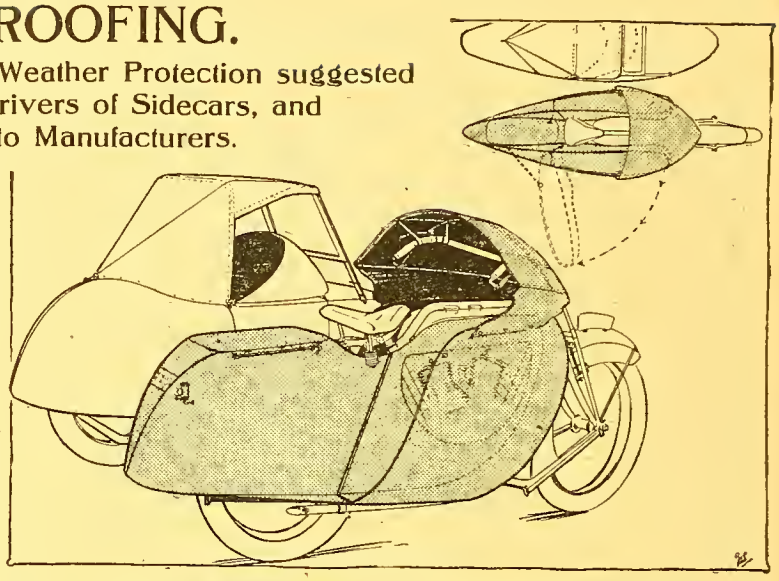
WEATHERPROOFING.

A Few Ideas on Mudguarding and Weather Protection suggested primarily for the Benefit of Drivers of Sidecars, and incidentally as a Hint to Manufacturers.

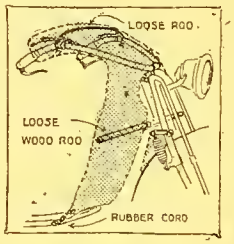
IN the issue of *The Motor Cycle* for September 5th we commented upon the increasingly important question of weatherproofing and mudguarding the motor cycle, with particular reference to the needs of passenger outfits. With solo machines, of course, any extravagant shielding arrangement attached to the machine itself is precluded by the fact that dismounting would be practically an impossibility, and the effect of side winds would be a serious matter. But to a sidecar those objections are not so applicable.

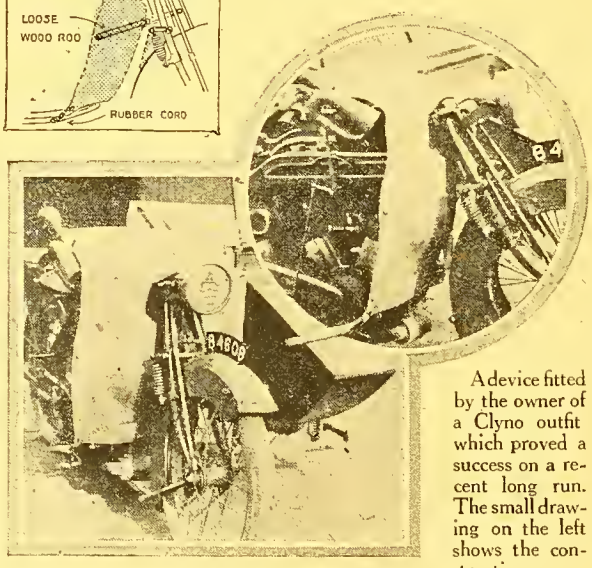
That the subject really needs attention is evidenced by the number of machines one sees in which weatherproofing has been taken up by the owner where the maker left off. Several examples of this are illustrated.

That the type and size of engine influences the problem is admitted, but we fail to see that there are many insuperable difficulties associated with it. From designs we have seen, the single seems quite amenable to this treatment; next in order come the V and the horizontal twins. The four-cylinder machine lends itself admirably to mud shielding, particularly the water-cooled models. The Scott sidecar model is one of the best protected machines in its standard pattern that we have seen, and the shielding arrangements, while undoubtedly effective, are not too ugly.



A combined arrangement by which the driver is well guarded from the weather and mud. This at the same time lends itself to the useful purpose of streamlining.

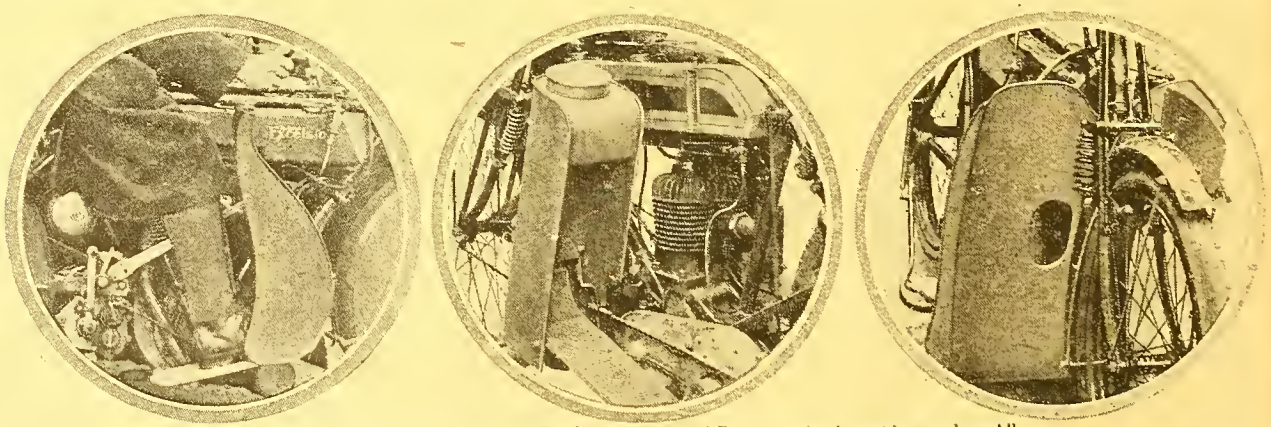




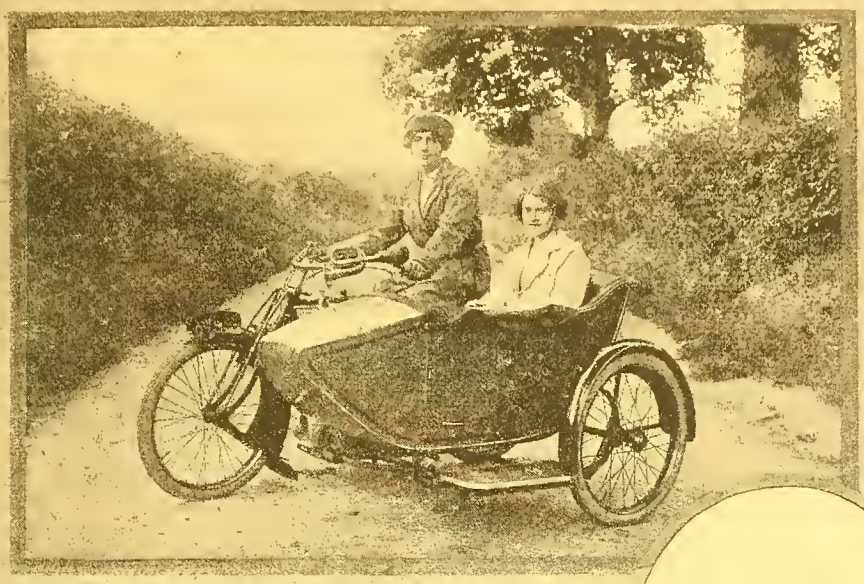
A device fitted by the owner of a Clyno outfit which proved a success on a recent long run. The small drawing on the left shows the construction.

With these rudimentary examples before us we feel convinced that at the expense of a little time and thought, the problem can be satisfactorily solved without resorting to such extreme expedients as driving from the double-seated sidecar. One idea—the Rogan coat—provides for a kind of waterproof cape attachment which buttons round the rider's neck and fastens to various points of the machine, so that the whole looks like a perambulating tent, but this is not a commendable line of development.

As a preliminary we would emphasise the neces-



Examples of weatherproofing on an Excelsior, White and Poppe-engined machine, and an Allon.

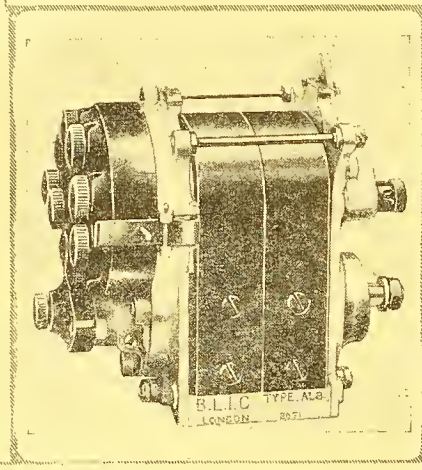


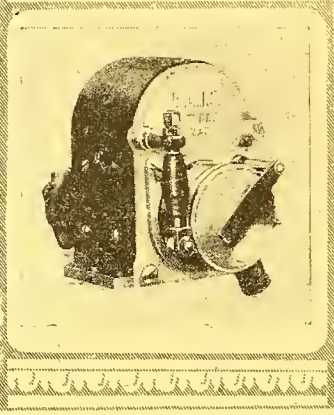
ARIEL

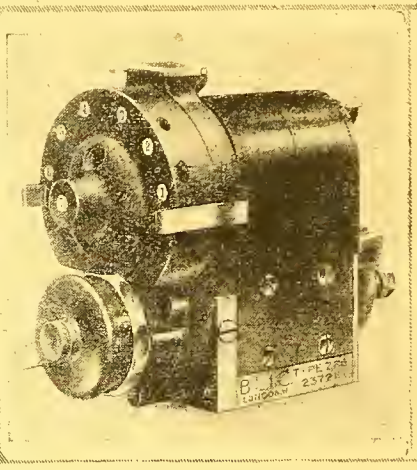
As a Lady's Mount—Perfection

is the opinion of numerous fair owners of Ariels.

ARIEL WORKS, Ltd.
3, Bournbrook,
BIRMINGHAM.







B·L·I·C

"The Magneto Pre-eminent"

ON CARS and Motor Bicycles, on Aeroplanes, Lorries, and Tanks—under the most exacting War conditions, the British-built "B.L.I.C." has fully proved its pre-eminence.

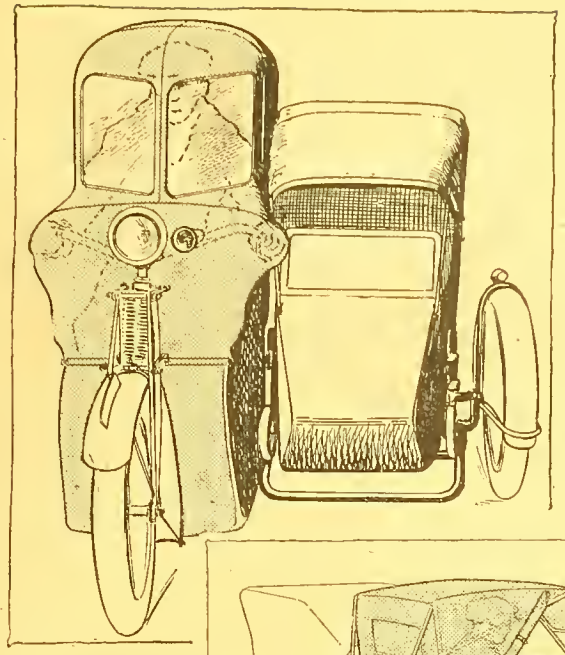
At present our entire output is required for the service of the Allied Forces, but after the war the "B.L.I.C." Magnetos will be available for everyone.

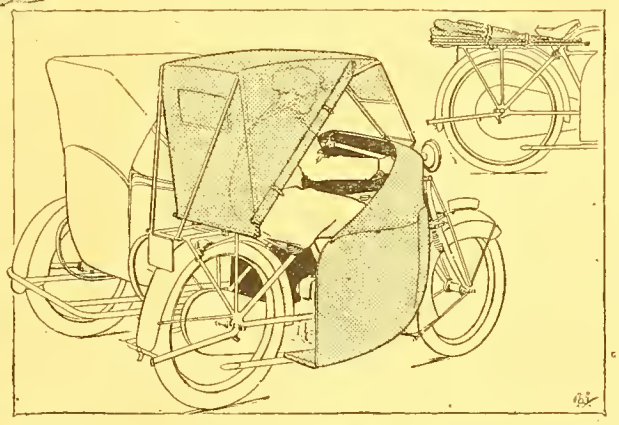
THE BRITISH LIGHTING AND IGNITION CO., LTD.,

Proprietors: VICKERS, LIMITED.

204, Tottenham Court Road, London, W.1.

Weatherproofing.—sity of providing an adequate shield underneath the engine and gear box wide enough and long enough to prevent any mud splashing up and on to the engine and the rider's legs. In addition to this, some form of extension to the side-car hood might be adapted to swing over the rider's head in wet weather and have attachment by straps to the cycle frame. A flexible windscreen could depend from this and be anchored to the handle-bars, so keeping the head and shoulders and most of the body dry. This could be elaborated indefinitely according to the taste of the designer.





Two suggested arrangements which give the driver of the machine complete protection. Telescopic supports were intended to be used.

Another arrangement to supplement this would provide a metal shield entirely enclosing the machine from the inside of the handle-bars as far back as the saddle, with an internal scoop arranged for cooling the engine.

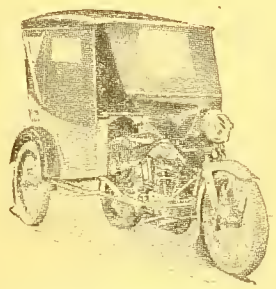
In all cases, however, where metal shields are used they will have to be easily detachable and absolutely rattleproof. Big front shields might be provided as shown on the Allon and Excelsior, with extensions as far back as the saddle, say, the top edge being provided with clips for a waterproof cape arrangement to go over the driver's shoulder; this arrangement has proved a success.

The off-side extension would have to be hinged for the purpose of exposing the engine, and the cylinders themselves would have to be cowled in, but open at the front to obtain the requisite cooling effect while protecting the driver's legs. A modification of this idea might also be carried out in waterproof material, though, of course, the more substantial and better job would be made by utilising metal, as it would be so much easier to clean, lends itself to streamlining, and would not require drying as would the absorbent material. For these reasons alone it would appear advisable to make something in the nature of "cab," either of small gauge metal or ply-wood, with celluloid windows. Something after the style of the ordinary car-type hood has distinct possibilities, and should form a very compact and unobtrusive bundle when folded out of use below the saddle.

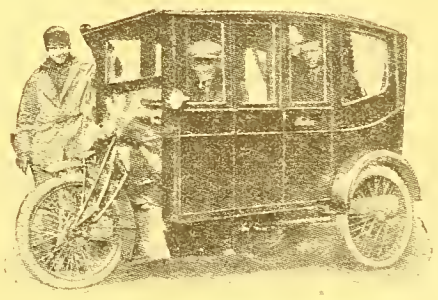
Of course the big disadvantage to be avoided in all these suggestions is the factor of handle-bar steering, which would necessitate in most cases having the hands through the protective covering. A suggestion overcoming this difficulty is shown. A *sine quâ non* of any scheme which is to be at all successful is unobtrusive portability. Complicated arrangements requiring several separate pieces to be buttoned and clipped together every time and folded separately when not in use are liable to be left in the shed when most wanted. The best combination of principles would be a fixed system of leg guards and engine cowling and a roller blind or automatic folding waterproof canvas hood and side curtains, which could rapidly be stowed neatly away when not required for use.

These few suggestions only roughly indicate the directions in which these much-needed improvements may be made.

The "Rogan" coat which covers all, a simple expedient.



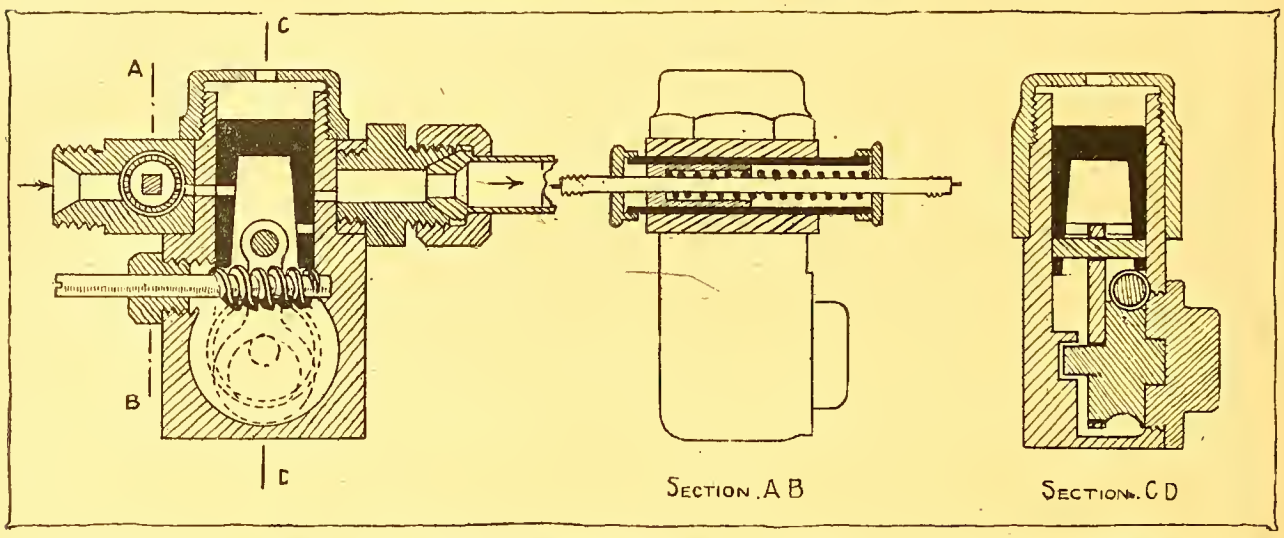
A weatherproofing idea adapted to an American Cygnet outfit.



A motor cycle Sedan built on a Cygnet rear car chassis.

THROTTLE CONTROL LUBRICATION.

The Lamplugh Pump in its Latest Form.



Section of the pump, showing the simplicity of its internal construction. This drawing shows the actual size of the instrument.

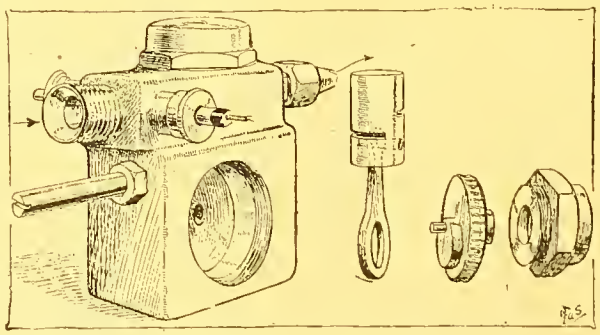
IN January, 1917, we gave the first description of a new mechanical oil pump for use on motor cycles controlled in conjunction with the throttle. Messrs. S. A. Lamplugh, Ltd., of Tyseley, Birmingham, who, by the way, are a separate firm and have no connection with any other, had, in the opinion of many, the most simple and efficient instrument then devised for this purpose. It seemed to be all that was required to solve the problem of regulating lubrication in proportion to the load. Several models have been running for long periods and giving every satisfaction—in one case for over two years' regular daily use without giving trouble. But this enterprising firm was not satisfied with success, and further experimental work directed to the elimination of moving parts, ball valves, springs, etc., has led to the present model—a completely different proposition, as much in advance of its predecessor as that seemed to be over previous attempts.

With simplicity an outstanding feature, the cost of production is consequently reduced, and quantity production rendered even more easy. Complicated parts do not exist; its action is certain and always under observation by the rider; it is capable of infinite variation from *nil*, increasing drop by drop to a continuous stream of oil. It is remarkably small, and easy of attachment to any part of a motor cycle from which driving power can be obtained.

Mechanical Details.

We can best describe it as a midget two-stroke engine where oil takes the place of carburetted gas and exhaust gas. A connecting rod big end bearing set eccentric on the face of a worm wheel imparts the up and down strokes to a piston in a vertical cylinder. This piston has ports on each side which register alternately with ports in the cylinder walls. The oil is drawn into the cylinder by "crank case suction" and discharged on the opposite side by "crank case compression," a two-stroke operation which is absolutely certain in its action. The likelihood of foreign matter obstructing the ports can be entirely eliminated by a suitable filter. In cold weather the action would be somewhat less effective when oil tends to increased viscosity, but this can be prevented by using thinner oil and running the supply pipe close to the cylinder or exhaust pipe. The working speed is quite slow, and the whole runs in oil, so that any question of wear need not be considered.

The control is arranged in the inlet pipe to limit the amount of oil before it gets to the piston. The method used is a sliding taper slot, operating across the inlet, so that the orifice can be altered from "quite closed" to "full bore." The small spring used here is similar to a carburetter spring, and is the only one in the whole instrument. The drive to the worm may be taken at any convenient point by simply keying it on to the end of a shaft or fitting a small spur or friction wheel.



The Lamplugh pump dissected. Note the ports in the piston.

The cost of such an article necessarily depends on the very doubtful question of labour and material after the war. Therefore, it is unwise to give any definite price; but it is obvious that it cannot cost much more than the ordinary plunger pump, which will not be necessary when this pump is fitted.

Prejudice against Mechanical Lubrication.

Without a doubt there is still a long standing prejudice against mechanical lubrication in favour of the direct action of a plunger pump at the will of the driver; but the objection held out by this school against mechanical systems, *i.e.*, uncertainty whether the pump is operating or not, does not exist in this case, as the action is always in view at the sight feed. Darkness and an imperfectly designed sight feed are the only things preventing the action being visible. Throttle control of lubrication increases the oil supply just whenever the engine calls for more, whilst the direct plunger pump control gives the engine a supply only when the rider thinks it needs oil, whether it does or not. It is a case of the certainty of automatic mechanical action against the element of misjudgment always present in personal control.

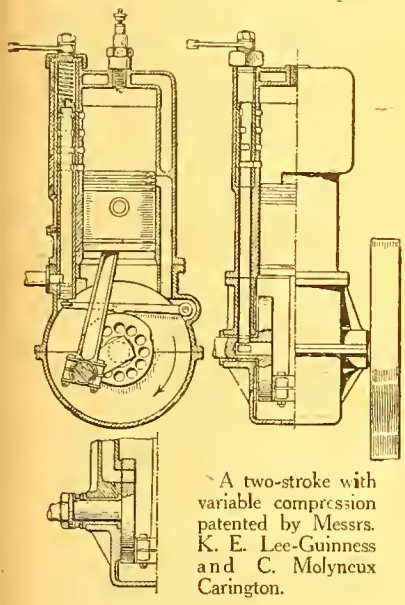
Messrs. S. A. Lamplugh, Ltd., are fully occupied on essential work at the moment, and cannot entertain any enquiries, except from *bonâ-fide* manufacturers, to whom specimen models for test purposes can be supplied almost immediately. They take unto themselves the title of "Petrol Tap Specialists," and with some justification, having regard to their output of these small articles. Of course, we cannot give the figures, but can only say that the output is so large that one wonders where the articles all go.

A TWO-STROKE WITH VARIABLE COMPRESSION.

ALTHOUGH many devices have been invented to reduce the compression of an engine for easy starting, an engine having a variable compression with several ratios is novel. Such an engine has been patented recently by Messrs. K. E. Lee-Guinness and C. Molyneux Carington (formerly C. Molyneux Smith), and is illustrated below.

It will be seen that the engine is of the two-stroke type, and has a cylinder provided with a conduit leading from the compression space to the crank case. In this conduit is located a valve, so timed and controlled that a part of the charge undergoing compression can be allowed to escape (*viâ* the conduit) back to the crank case. This, of course, reduces the compression without causing waste.

In one construction, ports are provided in the wall of the cylinder at different points in the stroke of the piston, so that they will be covered in succession by the movement of the latter. The ports in



A two-stroke with variable compression patented by Messrs. K. E. Lee-Guinness and C. Molyneux Carington.

the valve are so arranged in relation to those in the cylinder wall that more or less gas under compression is allowed to pass back to the crank case. The valve is in the form of a sleeve adapted to be rotated by hand, so that one or more of the ports can be opened. An inner valve reciprocating in the sleeve is timed and controlled by the engine, so that communication between cylinder and crank case is closed during the power stroke.

Alternatively the valve controlling the ports may be of the rotary type, constituting a part of the crankshaft or the crank webs.

The invention is most interesting, and should do much to increase the effective range of utility of very small engines used on lightweights and motorised bicycles. Whether the device is intended for engines of this character is not stated—the illustration depicts an engine of the water-cooled type—but undoubtedly the variable-compression engine is not confined to the purposes mentioned.

In passing, it is interesting to note that the patentees are well-known in the world of motor mechanics, and several inventions bearing their name have recently passed through the Patent Office. For this reason this device has an added interest, and, unlike many patents, we shall probably hear more of it.

THE 1919 INDIAN.

THE Hendee Co., in announcing their 1919 programme, emphasise the fact that the whole of their efforts are at present being utilised in the service of the United States, and very few, if any, machines will be available to the general public until the completion of the German downfall. The 1919 Indians are completely standardised, and only one Powerplus model can be had either with or without electrical equipment. The light twin is the same as for 1918. These with the sidecar and parcel car complete the Indian line for 1919.

Powerplus Model.

Ignition in the regular model is by the Dixie magneto. On the electrically-equipped model there is in addition a Splitdorf generator, accumulators, electric lighting, and horn. An ammeter is also provided. Military service has justified the faith which the company have placed in their spring frame, and this feature will be retained.

The Indian lightweight opposed twin, which, by the way, set up the wonderful record of 1,106 miles in twenty-four hours, is without material change from the 1918 model. The engine is of the long stroke type with outside flywheel and side by side valves.

The Hendee Co. hint at a newer member of the Indian family, which may be announced later when they have time to spare for its production. It has been fully tried and tested, and is merely awaiting the slackening down of Government contracts and release of material. No mention is made, however, of the type, nor are any details given.

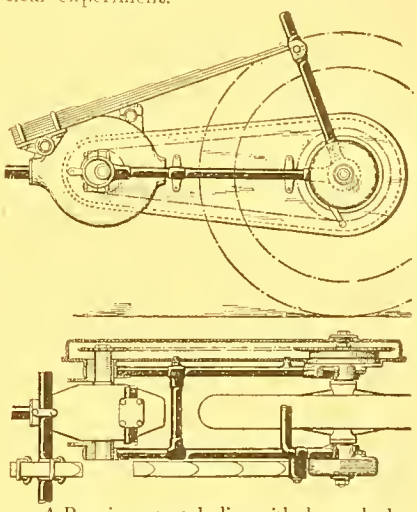
THE INFLUENCE OF AIRCRAFT ENGINE DESIGN

FROM time to time *The Motor Cycle* has published various opinions and *précis* of lectures, etc., on the subject of the possibility of the motor cycle designer learning something of substantial benefit from aero engine practice.

Mr. A. A. Remington, the new president of the I.A.E., presented some very decided opinions on the subject generally in his recent presidential address. He said: The experience gained in the manufacture of aero engines will have great effect on engine design; though pure invention must still be encouraged, scientific research by manufacturers will be even more necessary as the scope for improvement becomes less obvious. The war gave great impetus to individual metallurgical research, owing to the necessity for greatly increased output of machinery of the highest class, and also owing to the necessity for the whole of the output to meet the stringent Government requirements. One of the immediate results of this work will be to give automobile engineers after the war an adequate supply of materials superior to what they had available previous to the war. By taking advantage of the increased knowledge, particularly of materials, stress distribution in engine parts, and flow of gases, gained from research primarily on behalf of aeronautical engine development, there is no doubt that the post-war engine will embody great improvements, perhaps more particularly as regards power-weight ratio, economy, and improved power performance at lower cost, without serious corresponding disadvantages.

A PREMIER THREE-WHEELER?

ALTHOUGH it can be said that fully 75% of inventions that pass through the Patent Office never fructify, when patents bear the name of well-known manufacturers they usually signify that those firms are experimenting with devices mentioned in their specifications. Present-day patents, however, are more or less paper inventions, as neither material nor labour is available for practical experiment.



A Premier patent dealing with the method of adjusting the driving wheel of a three-wheeled cycle car.

From the patent illustrated here, one deduces that the Premier Co. is at least interested in a three-wheel runabout, and if the other parts of the vehicle are in keeping with the rear wheel unit it would appear that the machine will be on somewhat ambitious lines. The patent deals chiefly with the method of adjusting the single driving chain, the springing, and the chain case. The chain adjustment embodies eccentric sheaves, which constitute the pivots about which the forward end of the wheel frame swings, while the enclosed chain case remains undisturbed when adjustment is made to the chain. The springing is of the quarter-elliptic type, inclined from the "chassis" to a yoke member which passes over the wheel and connects at each end with the wheel frame or stays.

The drawings suggest a quickly detachable interchangeable wheel and shaft-cum-chain transmission, but the type of gear box is not clear.

CURRENT CHAT

SPECIAL FEATURE

WEATHERPROOFING. OVERSEAS SECTION.
THE CROSSHEAD PISTON.

TIME TO LIGHT LAMPS

GREENWICH TIME.

Oct. 31st	...	...	5.5 p.m.
Nov. 2nd	...	...	5.1 ,,
,, 4th	...	...	4.57 ,,
,, 6th	...	...	4.54 ,,

Exhibition of Enemy Aircraft.

Next month the Exhibition of Enemy Aircraft at the Agricultural Hall, Islington, will be open to the public.

Field Boots and Winter Riding.

Field boots will be popular for motor cycling after the war, particularly in winter. The thousands of officers whose kit includes Wellingtons will be bound to make good use of them when motor cycles are more numerous than they were in pre-war days, and others will copy their lead, for warm and dry feet have always been a problem for the "all-weather rider," and there is nothing better than field boots.

Sale of Army Motor Cycles.

Speculation is rife concerning the disposal of the large number of Army motor cycles after the war. Some people hold the opinion that they will be offered for sale in the condition they are returned from the Front, whilst others anticipate that they will first of all be thoroughly overhauled. The question of the disposal of motor vehicles at the conclusion of the war is one at present engaging the attention of one of the Reconstruction Committees, and meanwhile its decisions are awaited with interest.

A Motorist's Successful Appeal.

A member of the Automobile Association was fined 40s. by the Bromsgrove justices on June 25th last for unlawfully using petrol substitute for the purpose of driving a motor car contrary to the Motor Fuel Order.

At the hearing of the case the motorist stated that the journey in question could not have been undertaken otherwise than by car, for the reason that he lived a distance from the nearest railway station, and was therefore unable to obtain and carry home household supplies without the use of the car. Notwithstanding this evidence the Bench, although not quite agreeing upon the case, decided to convict.

The Automobile Association lodged an appeal on behalf of the member, which was heard at the Worcestershire Sessions on the 16th inst. In support of the appeal it was pointed out that the motorist could not have carried the goods home otherwise than by car, and that the car was used for a reasonable purpose. The Court concurred, allowing the appeal with costs.

Bowden Brake Co.

A dividend of 12½% (free of income tax) on the preference and ordinary shares of the Bowden Brake Co. has been recommended.

Concrete v. Dirt Roads.

An American journal states that it is estimated that if all the highways travelled by the 400,000 motor trucks in America were concrete the annual saving in their operation would be over £5,000,000, as compared with the cost of operating them on dirt roads.

Motor Cycle Supply in the U.S.A.

The United States is going through the same stage of the war as regards motor cycles as we were two or three years ago. It is quite possible that the Government may not allow any more motor cycles to be made in future, with the result that the price of second-hand machines will be inordinately inflated.

The Harley-Davidson Co. reports that it will not be able to make deliveries of motor cycles and sidecars up to January 1st, 1919, and indications point to the probability of no more motor cycles and sidecars being delivered for private use until after the war.

The Hendee Manufacturing Co. issue a practically similar statement. The entire burden of the Indian message to users is "Uncle Sam first."

At the present time other factories are not affected, and the conditions are not yet so bad as they were in England when the sale of motor vehicles for ordinary uses suddenly ceased.

New Works and Extensions.

No new works, or extensions of works, are to be begun unless they are immediately necessary for winning the war.

Report of the Enfield Cycle Co., Ltd.

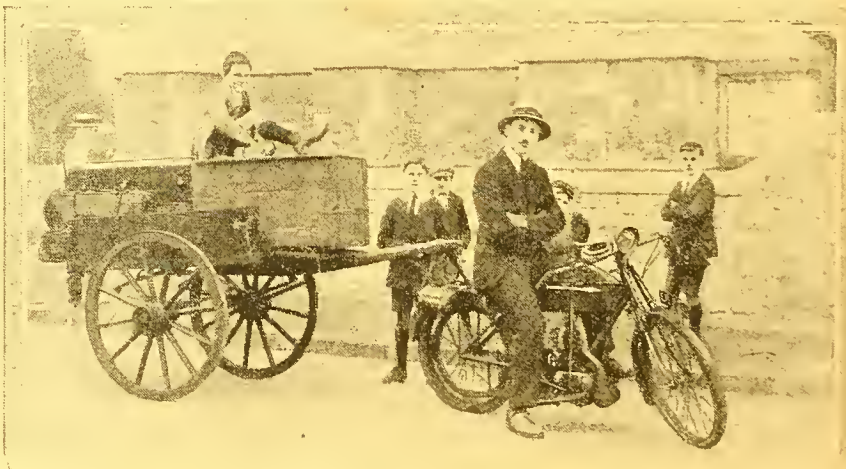
The directors of the Enfield Cycle Co., Ltd., recommend a dividend of 12½%, free of income tax, on the B preference shares and ordinary shares for the twelve months ended August 31st.

Influence of Aero Engine Design.

Those readers who may doubt that aero engine design will influence motor cycle design of the future should read Mr. A. A. Remington's opinions expressed in his presidential address to the Institution of Automobile Engineers. His remarks, of course, referred particularly to cars, but there is so much in common in car and motor cycle engines that the remarks apply with almost equal force to motor cycle engines.

Tank Corps Prisoners of War.

On November 7th Mr. Harry Tate has arranged a matinée at the London Hippodrome in aid of the Tank Corps Prisoners of War Fund under the patronage of the King and Queen. Definite promises of support have been received from many famous artistes, including Mr. George Robey, Mr. Arthur Prince, Miss Violet Loraine, Miss Margaret Cooper, Mr. Harry Weldon, Mr. Harry Dearth, Miss Phyllis Bedells, and, in addition, the band of the Welsh Guards and the pipers and drummers of the Scots Guards will appear by permission of their respective commanding officers.



A LIGHTWEIGHT USED DURING A REMOVAL.

A heavily-laden handcart is shown attached to a 2¾ h.p. two-stroke Royal Ruby, which is doing thirty miles a day on Government work. According to its owner, Mr. J. A. Bartson, A.M.U.C., A.R.C.S., the truck and load weighed approximately 5 cwt., and the machine climbed the well-known Richmond Hill successfully with this load.

THE MOTOR CYCLE

AVIATION SECTION

German Aeroplane Shortage. Commissions in the R.A.F.

Death of Aviation Pioneer.

M. Léon Morane, the French aeroplane inventor and pioneer in aviation, has died.

—◇□◇—

Radium Substitute.

A substitute for radium has been discovered, and named "Menothorium."

Prediction is made that this new mineral will come into wide use for luminous dials for aeroplanes and compasses and for gun sights.

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Airman's Remarkable Experience.

Reuter's correspondent furnishes the following details of an Australian airman's week's experiences in Palestine: Captured with his observer, after a forced landing. Bombed three times by British 'planes. Injured by British 'plaue, which alighted near the wreck. Brought back to our lines strapped to the fuselage.

—◇□◇—

R.A.F. Uniforms—Another Order.

Despite assurances in Parliament and elsewhere that officers would be permitted to wear out their old khaki uniforms, a new R.A.F. Order has just been issued to the effect that the only recognised uniforms for R.A.F. officers are the new design R.A.F. khaki and R.A.F. blue patterns. So it is goodbye to the "streamline" cap and the double-breasted tunic, whether they are worn out or not.

More R.A.F. Feathers.

A *Daily Sketch* correspondent says: "They have a passion for feathers among the birds of the R.A.F. I learn that the same sartorial genius who devised the comic Blue Hungarian kit is now engaged upon designs of a uniform for the huge army of girl typists and clerks who are employed at the Air Ministry."

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Technical and Administrative Commissions in R.A.F.

A correspondent to the *Pall Mall Gazette* says: "I hear that the Royal Air Force has reverted to the old R.F.C. method of accepting civilians for technical and administrative commissions. They were known as 'equipment' commissions in the F.F.C. days.

"A curious state of affairs exists at the school of instruction where these men are trained. Though civilians, they become officers, on probation, as soon as they are accepted, and are treated as such. N.C.O.'s and men of the Army, however, who are accepted by the R.A.E. go through the school as sergeants, or corporals, or privates, as the case may be, while the untrained civilian has the uniform and privileges of an officer.

"I believe, however, that in the near future all men accepted for training for commissions in the R.A.F. are to be cadets, following the Army method."

Output of Aeroplanes.

British factories are now making in a single week more aeroplanes than were made during the whole of 1914.

—◇□◇—

"Nerve!"

Spectators of a flying accident near an aviation centre the other day had an illustration of airmen's "nerve." One had crashed down in an orchard, to certain death, everybody thought. The machine had fallen on a treasured apple tree, and all thought the occupant had come to a dreadful end. But the tree had saved him, and before descending he gathered the few apples on the tree—much to the owner's annoyance.

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Shortage of German Aeroplanes.

A captured order, signed by General von Below, has now placed it beyond doubt that the enemy's air resources are becoming increasingly inadequate. This order reads: "The best means of defence against enemy airmen are our scouts, which are being reinforced. Their number, however, will never equal the enemy's strength in fighting machines. As a result, troops will often have the impression that they are not being protected. They must rely on defence from the ground against their most dangerous air opponent—the low-flying machine."

A squadron of R.A.F. scouts on the Western Front ready to start on a "stunt."

NIGHT LANDINGS

The Difficulties and Dangers of Forced Descents in Darkness.

LANDING will always be at once the most difficult and dangerous part of flying. Its main and permanent danger depends on the fact that the preliminaries of landing entail low altitude work. You cannot land without descending through the dangerous air stratum from 500ft. down to ground level. Within this stratum an aeroplane's power of automatic recovery is practically *nil*. A good pilot may pull a machine out of trouble below 500ft., but the drop is insufficient for the plane to right itself. Of course, this same stratum has to be traversed in getting off as well as prior to landing. But in getting off, your objective is the sky as a whole, so that no particular compulsion of angles affects your manœuvres. In descending, on the other hand, you are steering for a particular patch of ground: you have to approach it (for preference) dead upwind: and you have to flatten out at a set moment. Miscalculations lead to sudden use of the controls. Finally, the air near the ground is bumpier than at altitude, and various obstacles set up awkward wind currents.

A forced landing is obviously fraught with infinitely greater dangers than a voluntary landing: and as a night landing is trickier than a day landing, a *forced landing at night* stands out as the supreme experience of normal flight.

Signalling.

Ordinary night landings on an aerodrome become extraordinarily simple after a very little practice. To enable the pilot to land up wind, a "T" or "L" is used, composed of flares or of electric bulbs. A system of light signals can easily be arranged for the organisation of the landing of several machines which are flying simultaneously, and the pilots can employ a Verey pistol or other suitable apparatus for asking questions of the ground officer, or signifying their intentions. Intercommunication between aeroplane and aerodrome is thus fairly simple. The pilot's chief preliminary troubles may consist in finding his aerodrome after flying, say, 100-300 miles at varying heights with many twists and turns; and, secondly, in timing his downward slant so as to hit the "T" at the correct level. Instruments are slowly being perfected: but an altimeter is still apt to "lag," and pretend that the machine is higher up than it actually is, whilst the lateral level meter wants close watching when you cannot see any horizon, or trim the plane to an even keel by the help of the skyline. When the war is over, the use of distinctive lighthouses will facilitate navigation by night, and perfected instruments will assist the night-flying pilot to approach the aerodrome at the correct level and on an even keel.

Should a machine have "crashed" on the aerodrome, the wreckage may be cleared, or its position indicated to pilots still aloft by means of warning lights.

Judging Height at Low Elevations.

If everything has gone well so far, and the pilot is approaching the "T" at the correct height, in the teeth of the wind, and with an undamaged aeroplane flying in a straight line on an even keel, he has still a task before him. He has to flatten out at the correct distance from the ground, which should not exceed 3ft. Despite the radiance cast by the assisting searchlight (if any) from behind his back and along the "landing lane," it is astonishingly easy for a 'prentice hand to commit one of two blunders. He may misjudge his height, and flatten out at, say, 15ft. up. The machine will then "pancake" with a thud, and in extreme cases the undercarriage will be ripped off or concertinaed, seeing that the 'bus retains some of the forward impetus gathered in its downward glide at upwards of 50 m.p.h. There is quite a lot of forward impetus about such a pancake landing

Night Landings.—

with a 'bus weighing a ton or more. The jolt is distinctly perceptible, and the tail end of the crank-shaft is in line with your "tummy" and unpleasantly near to it. On the other hand, when you arrive at the landing point you may be 50ft. up, or more, and not recognise the fact. If the aerodrome is small, an overshot landing may spell a cartwheel crash against the fence at the far side of the 'drome, unless you attempt a rather special landing. The best thing to do is to open out the engine, make an extra circuit, and try again. But if you are tired and cold, you may be tempted to chance matters, and essay a type of landing beyond your skill. In that event a "write-off" is exceedingly probable.

The infrequency of landing crashes amongst night-flying pilots at home and abroad is therefore a great testimony to the ability of our men and the efficiency of their training.

Forced Landings.

If the foregoing paragraphs have made inexperienced readers realise the difficulties of voluntary landings at night, sympathy will go out in full measure to the unlucky pilot who is compelled to land at night. A forced night landing may conceivably be a very simple affair. Perhaps the engine goes dud at 5,000ft. above the aerodrome. The resultant landing is an ordinary night landing in every respect, except that you cannot try again: a misjudged glide cannot be washed out by making an extra circuit. Consequently, with a dead engine, the pilot is extremely careful not to overshoot the mark. A nervy man might conceivably bring his machine down short of the aerodrome, and "crash" in putting the nose up a little to prolong his glide and reach the aerodrome. Night pilots are naturally selected from promising men, and, though miscalculations of threequarters of a mile in a landing approach are familiar experiences even in daylight amongst raw "huns," no night-flying pilot is likely to botch a forced landing on his own aerodrome.

Forced landings by night on strange ground come into a very different category. A properly-equipped night-flying machine will, of course, carry some lighting apparatus or other. But except in the case of a giant machine, which could mount a useful searchlight if required, no portable illuminant would burn for very long and also possess a big range. To quote extremes, a scout could carry a flare powerful enough to light up a decent area of ground: but it could not carry many such flares. A scout could mount one or two small lamps, but they would not burn long nor shine very far. When you are gliding downwards at, say, 70 m.p.h. along a gradient of 1 in 7, and have limited illuminants, you have to use the available illuminant at the correct moment. Further, the ground which your lights reveal may be extremely unsuitable for landing. The dropped flare or other illuminant may show sea, forest, buildings, mountains, telegraph wires, or other assorted horrors. Decision has to be executed with lightning rapidity. If the engine has gone "dud" there is no help for it, no second chance. You have to pick the best bit of ground very swiftly and land on it somehow at the first attempt. The wind may be in quite the wrong quarter, considering the direction of your glide and the location of the chosen spot. More probably you have no notion which way the wind is blowing. Perhaps you have to get the 'bus wrenched right round at very short radius and with minimum loss of height. Anyhow, you have to think and act with consummate ease.

Gotha Pilots' Forced Landings.

It is comforting to note that the Gotha pilots have made successful forced landings at night in this country under distinctly awkward circumstances. As these big fellows are not nice to land at any time—some pilots assert "they don't 'land,' they just fall down"—it is evident that a good pilot can usually "scrabble" a handier type of machine to earth under the most adverse circumstances. Britons may be proud of the fact that night flying is quite a popular stunt in the R.A.F.

THE FLYING POILU.* Reviewed by "Torque."

MARCEL NADAUD has written a charming book, describing in dainty and humorous fashion a few episodes in the flying career of a Parisian working lad, who begins the war as a first-class air mechanic, and later on is promoted to gunner-observer on a two-seated pusher bombing machine stationed on the Vosges front. His nickname, "Chignole," is French garage slang for a hand bitt, which the hero considers essential in every repair or adjustment. Chignole's pluck and wit provide the sauce for the author's dishes, which are thrilling enough in all conscience.

After one crash Chignole stumbles to a farmhouse, and exchanges his wet, torn clothing for the housewife's skirt and camisole. When the squadron car re-enters the military zone with them the driver is arrested for bringing a woman into camp. Chignole's flying days terminate in characteristic fashion. The Boche raids the drome in snowy weather when all the pilots are at a cinema in the neighbouring town. Chignole, who has never before flown officially, goes up to drive them off, and does a "falling leaf" descent on his return. For his daring he receives the Military Medal. For his breach of discipline he is returned to the infantry: for his squadron-commander foresees an epidemic of unauthorised stunts amongst his ambitious mechanics. So the heartbroken Chignole takes his rifle, and presently goes "over the top."

The philosophy of this most charming book is that combination of fun and heroism which characterises the best soldiers in all the Allied armies. Beneath the surface there are hints of deeper things. Thus Chignole, the infantryman, mourns his lost aeroplane. "Now I am a number, a nonentity. There—I was beginning to be somebody." The individuality of flying is one secret of its fascination. Again, in the last chapter the hero is recovering from a shell wound in a Riviera hospital; and Chignole, the quondam member of the squadron mess, the petted darling of high-born nurses, wonders how the old life of the Parisian gamin will taste—*après la guerre!*

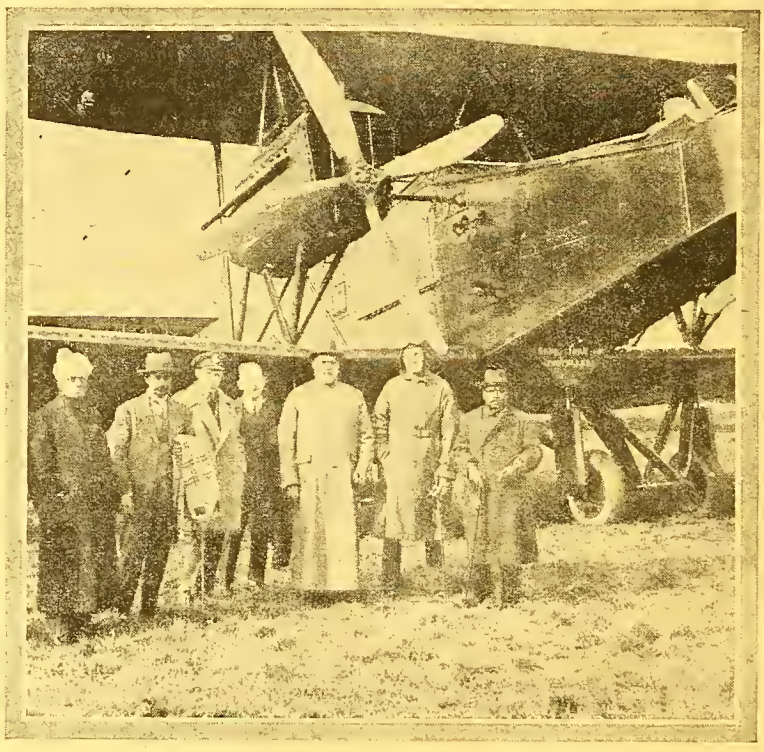
* By Marcel Nadaud. Published by Hodder and Stoughton, price 7s. 6d.

HOW AERO ENGINES ARE STARTED.

The Functions of the "Booster" Magneto.

By "TORQUE."

IN the early days of aviation engines were invariably started by "swinging the prop," *i.e.*, pulling the air screw over compression, and thus using it in lieu of a starting handle. This plan showed obvious defects from the very outset. Misunderstandings may arise between the pilot who operates the controls and the mechanic who swings the props. If the mechanic should slip on greasy turf, he will very possibly be killed. A single-seated machine cannot get away without assistance: if the observer of a two-seater swings the prop for his pilot, he will have to be very agile to get on board again. Prop swinging is impossible for sea-planes after a stoppage on the water. It takes three men to swing the prop of a 400 h.p. engine—and they do not enjoy their job! Consequently, some alternative method of starting up is becoming universal, and great ingenuity has been evinced in designing starters. In the early days electrical starters on motor car lines were tried, and small motor cycle engines of the air-cooled type were occasionally employed on giant seaplanes. It is impossible at this date to prophesy which pattern of starter will eventually triumph. At the moment the "booster" magneto is easily the most numerous. The pilot first of all scavenges the burnt gas out of the cylinders by turning the prop slowly backwards: then he opens the throttle and charges the cylinders with gas by turning the prop forwards: finally, he switches on, and spins the handle of a small single-cylinder magneto in his cockpit. The h.t. cable of the "booster" magneto is coupled to the distributer of the service magneto through a device which prevents its spark occurring before a piston has passed the top of its compression stroke. This system possesses the following merits:



Indian editors on the Western Front. Lt. Hardy, the pilot who took up the Handley-Page, and his passengers.

The Merits of the "Booster" Magneto.

(*a*) Low weight.
(*b*) Cheapness.
(*c*) Simplicity.
(*d*) Starting becomes a one man job.
(*e*) Damage is eliminated.

Except in emergencies, a mechanic scavenges and charges the cylinder *via* the prop whilst the pilot operates the engine controls.

On the other hand, the "booster" magneto does not eliminate the fatigue of "prop swinging," and therefore is not a true "seat starter."

The German Method.

The 300 h.p. Maybach engine, as fitted to the Zeppelins and super-Gothas, includes a device which vastly facilitates starting on a booster magneto. A lever on the valve chest can be operated by hand to open all the valves: it simultaneously closes the exhaust manifold by means of a shutter. This control lever can be locked in the above position by passing a peg through a hole in the lever and through a second hole in the quadrant of the lever. The peg in question is the handle of the "booster" magneto, which is made detachable for the purpose: the idea is, of course, to prevent the engine from being started with the exhaust manifold closed. The procedure is as follows: Open valves and shut the exhaust pipes: lock lever with magneto handle: charge cylinders with gas by means of doping pump: release lever and replace peg handle: operate booster magneto, when engine will start.

The above system was first introduced for use on the Zeppelin airships.

Other systems embody the use of cylinders of compressed air in conjunction with distributer valves, as a substitute for prop swinging.

An American Government representative, after five weeks spent in interviewing Allied aeronautical, engineering, and trade authorities, reports their appreciation of the U.S.A. efforts. He says the Liberty motor is hailed as a huge success, and the opponents of a standardised aero engine now admit that America is destined to lead the world in the rapid production of high-powered engines.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

A "Ford" Motor Cycle?

It is dangerous to predict, as one prominent journalist, who really "takes the biscuit" in this respect, has perhaps observed, but it does not require the foresight of a prophet to realise that those people who talk about a standard type of motor cycle superseding all others are fairly wide of the mark. Undoubtedly we shall have, sooner or later, a Ford among motor cycles—a cheap quantity produced machine consisting, of course, of standard components; a machine which will open up the highways and byways to many thousands who otherwise would be more or less confined to the densely populated areas; a machine which would popularise motor cycling to a degree hitherto undreamed of. But the introduction of such a machine will no more affect the industry in general than has the Ford car affected the motor car industry; at least if any result is noticeable it will sure to be beneficial.

As to what form the Ford among motor cycles will assume it is difficult to imagine. Two gigantic demands will face its producers: one for a light solo mount for the multitudes, as cheap to maintain as it is in initial cost, a machine within reach of the labourer of farm and factory, and as such it must be light and small engined—in fact, purely a solo mount; the other demand being for a machine suitable for passenger work or for commercial requirements, which can take not only its owner but also its owner's wife and family into the hills, or which can be used for commercial delivery of the kind required by retail tradesmen. There are thousands who would buy the light solo mount, and similarly there are thousands who require the cheap passenger machine which is destined particularly to hold an important place for delivery purposes; but which of the two offers the largest market it is difficult to say, and the conclusion to which one naturally comes is that there is room at home and abroad for both.

British Conservatism.

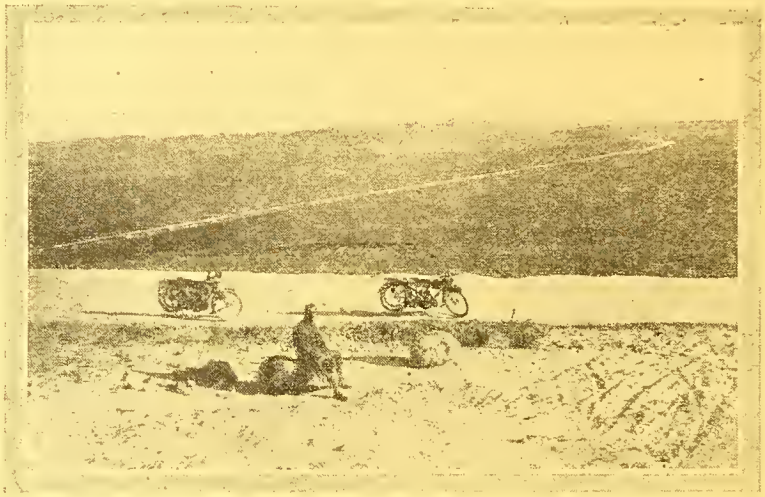
Time alone will show us whether it will come within the scope of the British manufacturer to produce these machines for the multitude. In the past, with machinery of every kind, quantity production has been left to other countries, and the British manufacturer has gone his own blissful way, supplying a market which, though perhaps small, was at any rate rich and

Motor cycle machine guns passing French transport on the Menin road in the neighbourhood of Gheluvelt.

Overseas Section.—

ready. Concerning the motor cycle market, the same condition of things will probably continue to prevail.

No machine offers such scope for a variety of pattern and design as the motor cycle, and British people the world over are notoriously faddists. When once a Britisher gets it into his head that one particular type of machine is better than another he sticks to that opinion, even in the face of obvious proof to the contrary. In America it is largely a matter of boosting one type sufficiently and the public will buy it, whereas the British rider, if once the idea is rooted in his mind that, say, the 4 h.p. two-stroke is the best machine for him, is going to have a 4 h.p. two-stroke even though he is compelled to have it built. Moreover, he will occasionally burst into print concerning the merits of the 4 h.p. two-stroke for a full decade after the type has become obsolete, just as there are to-day conservative gentlemen who swear by the surface carburetter, and who speak of the old De Dion quad as a production belonging to a lost art.



One of the very few good roads to be found in Palestine. This one lies west of Jerusalem.

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No Question of Monopoly.

THAT being so, there will always remain a sufficient demand in England and our Overseas possessions for the various designs our manufacturers choose to specialise in, and the Ford among motor cycles will be more of a boon to British manufacturers than otherwise, since it will merely introduce hundreds to the pastime who, content to begin with the cheapest machine obtainable, will later aspire to a superior vehicle. The old market will remain even if a new one steps in, and the motor cycle selling at £20 or thereabouts will appeal only to a certain class of rider. Our cousins across the Atlantic regard the motor cycle more as a cheap and convenient method of transport than as a hobby in itself, and therefore the quantity-produced machine stands a better chance of monopolising the market there than here.

The Overseas Motor Cyclist.

IT is to be feared that many of the Overseas Dominions have already been stripped of their keenest motor cyclists. As in the Mother Country, the man who motor cycled did so chiefly from a sporting point of view—not that he rode solely for sport, but being an active man and a lover of the open air the motor cycle naturally appealed to him as a means of progress. He was among the first to go, and no one appreciates more fully than the sportsmen of the Mother Country how deeply our Colonies have bled in this terrible world-war. Yet there is always the rising generation—the sons of those who have gone and the sons of those who, through increasing years or through the important posts they hold at home, are not taking a soldier's part in this bloody encounter.

The world over there will be a general stampede to renew the activities of sporting events when peace is resumed. Every motor cyclist in the Army, every motor cyclist at home—and he, at present, has the hardest work to face—is keen to get astride his favourite mount once more and pit his skill as a tuner and rider against his comrades. Thus it is pretty certain that, within a short period of the dissolution of our arms, the world of motor cycle competition will be more keenly at work than ever before, though it is to be feared that, for a time at any rate, the competing machines will be of the "old crock" type—cleaned and tuned up for the event after lying in a condition of hibernation since 1914 or thereabouts.

Of course, there will be American machines of more recent date figuring in these competitions immediately succeeding the war, and with any degree of luck the Americans should have a heyday in the way of prize-winning; in spite of the croakers who prophesy that competitions are doomed, there will be more enthusiasm than ever, and the rivalry between owners of British and American machines is sure to be keen.

A Selection of Letters from Readers scattered all over the World.

A Colonial Post-war Ideal.

"PLANTER," writing from Perak, F.M.S., says: "On the grounds that motor cycling in this country has not received much attention in your popular paper, I would like to make a few remarks *re* the Colonial model. I think a motor cycle incorporating the following details would be an ideal mount for this or similar country:

"(1.) 3½ h.p. flat twin engine.

"(2.) 6½in. ground clearance. The estate roads are encumbered with half-submerged jungle.

"(3.) No nickel-plating. Semi-touring handle-bars.

"(4.) Not too many intricate parts. Cleaning is a nuisance in a country with dust half an inch deep on all the roads, and the nearest good repair shop is fifty miles away, the nearest station being about twelve miles away.

"(5.) Four-speed gear box, chain-cum-belt drive. Spare chains are non-existent, and can only be got from India.

"(6.) Large tanks and suction drip-feed lubrication. There is not a single petrol store within a radius of eight miles.

"It would be a great relief to all Colonial riders if spare valves and springs were incorporated in the kit. The agents never have any spares by any chance whatever, and if you want a valve spring you are handed a box of 'assorted springs' from which to take your pick. The price of most machines at present is about $800 ($8.50=£1) without lamp or horn, which will cost you $100, and in spite of the

Overseas Section.—

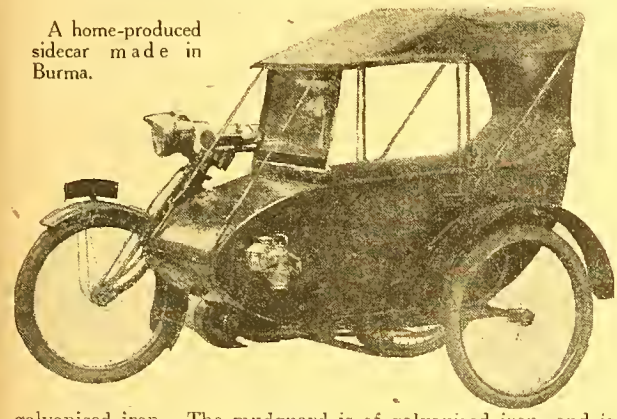
price nearly every 1917 English motor cycle has turned out a 'dud'; they seem to be rejected Government machines. In fact, the saying is, 'Get a post-war and 1917 model American or a 1915 English machine,' and, from what I have seen, my post-war machine will be an American. Take the case of one of my friends. He bought a 1917 3½ h.p. flat twin of famous make for $875. In the first fifty miles the crank case drain plug fell out (there was no thread in the crank case—'it must have been overlooked'). As a result he smashed his piston and bent the connecting rod. This was repaired, but on his second ride the magneto and flywheel came adrift, and nearly every ride since then has been accompanied by slipped timing and loose magneto and flywheel. This is only one of many similar cases, while American machines seem as reliable as ever, and spares are easily got from the agents of the American machines in this country. Nevertheless, we have much to be thankful for: Petrol in any quantity at 2s. 6d. per gallon, no speed limit except bullock carts, and no 'men in blue.'"

A Home-made Sidecar from Burma.

Mr. S. R. Scutt, Tavoy, Lower Burma, writes: "I am forwarding a photograph of my home-made sidecar. New sidecars being unobtainable I set about building my own.

"I bought a rusty, old, wicker body affair, and scrapped everything but the bare chassis and wheel.

"The body sides are made of straight pieces of ¾in. thick wood, and the back and front curved portions of sheet



A home-produced sidecar made in Burma.

galvanised iron. The mudguard is of galvanised iron, and is fixed to the body, not the chassis (car practice).

"The whole thing is painted a rich dark green, and presents quite a smart appearance. The upholstery and painting were done by a local garage. The machine is a 3½ h.p. Zenith."

American Handle-bars in France.

Mr. P. R. Coes, formerly of the Hendee Manufacturing Co., now a second-lieutenant in the U.S. Army in France, writes:

"This is in reply to the writer of your Overseas Section on the question of American handle-bar equipment for motor cycles in France.

"In purchasing American motor cycles, the U.S. Government buys, invariably, manufacturers' standard models. Being the makers' standard, it is, of course, fitted with the most comfortable and practical handle-bars known to them. It is interesting to note the close resemblance of the Indian and Harley-Davidson bars.

"The semi-T.T. Indian bars referred to were brought out for the particular benefit of a very fine class of British sportsmen, known as 'knuts,' in order that they might roll in at such places as Wisley Hut in real sporty form. This bar was never considered practical for American touring conditions—from the results of experience and test.

"No doubt many American D.R.'s assume awkward and strained riding positions; but this is due to inexperience, rather than the shape of the handle-bar. Many American riders have not had six months' service on motor cycles.

"On the other hand, I have personally seen British D.R.'s riding in that well-known semi-side-saddle position, with one hand reaching far out ahead to the bar and the other hand resting on the knee or hip. This position is assumed only from extreme fatigue—as I know, from experience with T.T. bars.

"The T.T. or semi-T.T. bar is very nice to look at, or for a hundred miles of the North Road, but I doubt if it can ever find its place on the American standard product. It is also to be noted that the majority of British machines used by the French are fitted with touring bars. Furthermore, before the war, when the trials were going on, did such masters as the Collier brothers ever show up at even a short trial with anything but touring bars? E. G. Baker, the best road rider in the States, has never used anything but standard Indian bars. Does he know much about fast road work?

"However, the handle-bar question and the question of controls come right down to this: You use yours, and we will use ours; both apparently give satisfaction in the lands of their origin.

"Owing to the shortage of shipping facilities, the A.E.F. is using quite a few Rovers, Douglas, and New Imperial (equipped with touring bars), and, according to all reports, they are doing very well.

"No doubt the American D.R.'s are recovering from the first shock at the sight of English Bowden controls—the same shock which caused so many silly comments."

Severe Criticism.

Mr. S. C. du Rose, writing from German East Africa, says: "With reference to your remarks on 'Overseas Trade Development,' you are quite right in saying the Canadian trade wants to be cultivated—in fact, to do any good much more must be done than you mention.

"At the present day even 'Colonial models' of the British firms are built, so it seems to me, by one who only knows what he has been *told* of road conditions abroad! Therefore, the American machine beats the British every time in Canada because it stands up to the bad prairie trails. British machines are all right for town riding, but beyond the properly laid out streets they are no good.

"Spare parts, too, are hard to get for British cycles. I was once unable to get a throttle wire in a big place like Winnipeg. Tyres, too, are often hard to get for our lightweights in some towns.

"The chief thing to my mind that puts the English machine out of it is the price in Canada. Some makes are priced, in Canada, nearly as much as an American car, so the Canadian motorist plumps for the latter—with the maker's workshops and spare parts near at hand.

"In order to put the British product over the American in Canada a firm will have to set up a factory there and manufacture the motor bicycles on the spot, thus saving on carriage and taxes and making a motor bicycle suitable for the country with spare parts, etc., at hand. Unless this is done the American will get there first every time."

New Imperial Machines for U.S.A. Army.

WE have described from time to time the heavyweight outfit made by the New Imperial Cycle Co., Ltd., of Birmingham. These machines were originally intended for use by the Russian Army, but on the breaking up of the Russian Front the available supplies were taken over by the American troops for use in France. That they have stood up well to the hard work is evidenced by the continued orders. A very considerable number has already been supplied, and it is remarkable that, so far, the manufacturers have not heard of a single case of frame breakage. Except for certain minor alterations the machine now being supplied is the same as described in our issue of September 13th of last year: 8 h.p. twin J.A.P. engine, chain drive throughout, totally enclosed, countershaft three-speed gear box, 28in. wheels and 3in. tyres. Machines to this specification were put through a very severe test by Russian inspectors in November last, and came out very successfully. With their big ground clearance and large wheels and tyres and plenty of reserve power, they are eminently suitable for Colonial conditions, and should fill the bill for many Overseas riders.

It is interesting to record that the lightweight model of this firm, the 2¾ h.p. vertical single, is still being made, fair quantities being supplied for use on several war fronts, where it is giving excellent service as a light runabout.

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

WANTED, A FOOT CONTROL.

Sir,—I have received a permit to purchase a 1918 2¾ h.p. three-speed K.S. model Douglas motor cycle, which I hope will arrive in the course of a few days.

As I have lost my left arm, I should be obliged if any of your readers would design a method or suggest a mode of converting the changing of gears to a foot arrangement on the above model.

Perhaps it will interest some of your readers to know that, although disabled, I have ridden several mounts, including a T.T. Triumph, and I find that my right arm is more rigid after every ride. ONE-ARMED MOTOR CYCLIST.

Mold.

CHOICE OF THREE-WHEELERS.

Sir,—I should be much obliged if some of your readers who are, or were, owners of the Morgan Runabout would let me have their experience of this machine, as I am looking forward to having one as my post-war mount. The main reason I have for asking this is because in your issue of October 17th a letter addressed to you from "H.W.S." contains the statement that some of his friends say that the Morgan "will turn over in grease," and as I am not desirous of disguising myself as a "tortoise" I should like this point cleared up before buying one. I should be glad of the opinions of readers who have actual experiences in driving a Morgan, as to cornering, back tyre trouble and accessibility, holding the road at speed, to the water-cooled type, springing and general comfort of the car and whether there is much plug trouble. MONS RIBBON.

Barnston.

THREE-WHEELED CYCLE CARS.

Sir,—It goes without saying that there is a prejudice in favour of four wheels. The three-wheeler to be successful must have sufficient merit to overcome this prejudice. One may say that the three-wheeler must prove itself to be superior to the four-wheeler in order to prove equally successful. The designers of three-wheelers have to reckon with this prejudice; they will not be deterred by it if they have faith in the merits of their design. They may comfort themselves with a saying of Leonardo da Vinci, the supreme artist and the first inventor of the flying machine, "In Romagna, the realm of all stupidity, vehicles with four wheels are usual." Perhaps Mr. H. F. S. Morgan or Mr. Scott would not put his opinion of four-wheelers quite so bluntly!

It is only fair to consider dispassionately both the advantages and disadvantages of three wheels. The admitted advantages are two: (1.) Simplicity, and therefore economy. The three-wheeler can dispense with certain complicated and expensive parts. Moreover, the repairs of the three-wheeler, though not less numerous, are certainly less expensive. A complete overhaul can be effected at about the cost of a back axle. (2.) Lightness, and therefore speed, with a considerable economy of fuel.

The disadvantages attributed to the three-wheeler are: (1.) That with three wheels a two-wheel track is mechanically wrong, while a three-wheel track is unsuitable for rough roads. It must be admitted, however, that the Morgan, which has a three-wheel track, has gained more awards in competitions over the roughest roads than any other light car. (2.) The danger of upset at high speeds or on sharp corners. It is very doubtful if this has been proved in practice. The Morgan has been found safe to handle at over sixty miles an hour, and has only once, so far as I remember, failed to negotiate a hairpin bend in a public trial. Stability depends rather on a low centre of gravity than on the number of wheels. The three-wheeler is probably less liable to skid in grease, owing to the absence of a differential. (3.) Appearance. The three-wheeler is not describable as "my little car." It does not pretend to be so, but in its way the lines need not be less agreeable and artistic than those of the four-wheeler; the artist Leonardo, as we have seen, did not approve of four wheels. (4.) The fact that the back tyre, which takes all the work, wears out more quickly than the back tyres of the four-wheeler. This, of course, is true, but, on the other hand, it must be borne in mind that the cost of one tyre is half the cost of two, and therefore if the back tyre of the three-wheeler lasts only half as long as the back tyres of the four-wheeler it will cause no more expense. Moreover, the light weight of the three-wheeler adds considerably to the life of all its tyres. Lastly, there is the unpleasant task of changing a back tyre, and the difficulty of fitting (what was once a luxury, but is now coming to be thought a necessity) a detachable wheel. This is no doubt a serious trouble, but it is by no means insuperable. Meanwhile, if a good tyre is always kept on the back wheel, the trouble very rarely occurs on the road. Possibly before very long the difficulty will be solved, and the most persistent objection to the three-wheeler will then be removed. H. GEORGE MORGAN.

Stoke Lacy Rectory.

MOTOR CYCLES FOR COLONIAL USE.

Sir,—I am always greatly pleased to see your efforts to get motor cycles, especially the Colonial models, improved. I notice the contradictory "ideal" specifications you receive. This, I think, is mainly due to the various classes of work on which machines are used, and very often the short experience of your correspondents.

One point I must be dogmatic about—*ample mudguard clearance;* 3in. all round would not be too much. Again, for heavy machines, big tyres; 28×3in. is the minimum.

Of the fourteen machines I have owned, three have been Belgian, one Dutch, eight British, and two American. Of all these machines, I found the Harley-Davidson twin by a long way the most suitable, both for sidecar and solo work, as far as I was concerned, although, of course, this machine is far from perfect.

Belt drive I have given up for good; shaft I consider the ideal, but in the meantime have to use the chain. In this connection I have often wondered why more has not been done with shaft drive to the bottom bracket and the final drive by chain; the chain would lose most of its objections so applied.

Another point which stands out, to my mind, is the small use made of underpans. I have found them to cause a marked improvement in cleanliness to the whole 'bus. If the underpan is combined with *long* footboards, preferably of covered wood, it is a most desirable arrangement. I have had several machines so fitted, and the rear end of the footboards is an excellent place for carrying a tin of petrol or oil. In fact, it has always been a surprise to me to notice how an article will stay in such a position with the minimum of tieing on, even over the roughest going. It is evidently one of the "smoothest" places on a machine.

As it is close up to "lights out," I must finish off, wishing *The Motor Cycle* the continued success it deserves, and, further, adding that I have no interest in any machine at all beyond that of a user. H. C. MANFRED (Sgt.).

A.I.F.

THE THREE-JET BINKS CARBURETTER.

Sir,—Before this discussion closes, may I beg a small space to acknowledge Mr. Binks's letter (Oct. 10th, page 336) and to thank him for his invitation to call at his works. I shall bear this in mind when next I am within reasonable distance.

Apparently, our difference of opinion is not as to whether or not there is a "dead spot," but as to the cause of it, which Mr. Binks attributes to poor workmanship, and I to a defect in his design. May I suggest that neither explanation is very satisfying to a user who is troubled with the complaint?

Regarding the bottom air slide, I quite agree that I have "something to learn." *Most* people interested in carburation still have, I think; and it is news to me that the adjustment of this air slide is of considerable importance. If it is of any value for correcting the mixture it ought to be controlled from the handle-bar with a third lever (!) rendering the carburetter semi-automatic. In this matter I am pleased to err in the good company of Capt. Lindsay, who also cannot find that the slide makes much difference.

Mr. Binks may be able to get a decent mixture at all engine speeds, but certainly *not at all throttle openings*, and not under the varying conditions of load, and road, and climate. W.S.B.

Birmingham.

Sir,—In reference to Edgar E. Basevi's letter in your issue of September 12th *re* Binks three-jet carburetter, I have one fitted to my 4 h.p. Bradbury and sidecar, and was troubled with the dead spot referred to in his letter. I tried all sizes of jets, but was not able to get over the trouble when I opened on to the main jet. I have studied the working of this carburetter, which in my idea is perfect with the exception of the dead spot referred to by your correspondents. I should like to know what size of jets Mr. Basevi used on his 4 h.p. Bradbury with sidecar, and also the gear ratio he used on his outfit, as I could never get my top gear lower than 5 to 1 with N.S.U. gear with 18in. belt rim. I should also like to hear other readers' views on this excellent instrument.

G. MYERS.

HUB AND COUNTERSHAFT GEARS.

Sir,—I noticed with pleasure that, in your notes concerning a road test of a two-stroke engine, you refer to an advantage of the hub gear when used with a belt; but I also read an article in a contemporary of yours, dated October 8th, in which the hub change-speed gear is dogmatically swept on one side as extremely bad in principle and utterly useless. I think the latter statement is too sweeping.

We know that the countershaft gear, in some instances, is better than a hub gear, possibly because the weight is carried in the right place, and weight in the back wheel is detrimental in certain cases, but to dogmatise in the way mentioned above is not only unfair to the designers and patentees of hub gears, but is misleading.

The reason for the unpopularity of the three-speed hub gear is that when first brought out it was considered such a convenient accessory that it was seized on by many makers and used in too light a form for passenger work, for which it was unsuited.

The Armstrong three-speed hub gear was originally designed and made for the New Hudson Cycle Co., and fitted to the New Hudson-Jap 2½ h.p. motor cycle. On this machine the gear was a perfect success, with one exception, *i.e.*, that the small engine pulley caused a certain amount of belt slip when the belt was copiously wetted. This was more apparent when the pulley flanges were worn.

Proportionately to the weight of the remainder of the machine the Armstrong three-speed motor cycle hub gear was no heavier than a three-speed pedal cycle gear, and practical cycle manufacturers and riders do not decry the three-speed hub gear for push bicycles. The hub gear provides an ideal change as nearly proof against damage as it is possible to make anything that has got to be operated by riders of unmechanical temperament.

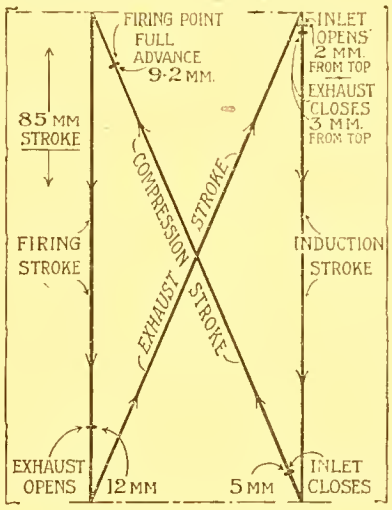
The most serious drawback to the hub gear is the fact that it is not oil-retaining. Instead of being oil-containing it is more like a centrifugal oil separator, and throws most of the lubricant to the inner wall of the outer shell, whereas the lubricant is wanted at or near the centre to ease the movement of the pinions on their shafts. The same remarks apply to any form of rotating gear of the epicyclic type including the Ford gear which would not run for long unless it were bathed in oil. On the whole the hub gear is lighter than any countershaft gear of equal strength. In the case of a belt-driven motor cycle the hub gear has the advantage of increasing the linear belt speed on the lower ratios (when the high speed is direct). The belt is more likely to slip with a countershaft gear owing to its reduced linear speed. In other words, the increase of the belt speed on low gear, as compared with the road wheel speed (the driven pulley revolving faster than the road wheel) is advantageous for belt work, whereas with a countershaft gear the belt speed never exceeds the road wheel speed.

I should like to see a lightweight introduced with a hub gear and chain transmission employing a countershaft to reduce the size of the chain wheels. The slight friction of the ball bearing countershaft would be negligible, and the chain drive should be arranged on one side of the machine to reduce the torsion on the countershaft.

MECHANICUS.

VALVE SETTING.

Sir,—The enclosed method which I use to illustrate diagrammatically the opening and closing of the valves of a four-stroke internal combustion engine relatively with the piston position may be of interest to your readers.



See letter from "G.H.B."

It shows at a glance the position of the piston at all movements of the valves on any of the four strokes, and also the position of the piston when the spark takes place. The overlap of the valves is distinctly shown.

The opening and closing of the valves can also be shown in terms of degrees or in times of the clock.

The more one works with the diagram, the more interested one becomes in the operation of valve setting. G.H.B.

Middlesbrough.

ONE-LEVER CARBURETTERS.

Sir,—*Re* my suggestions under the above heading published September 26th, I note in your issues October 10th and 17th letters from Mr. Tilston and from the Sphinx Manufacturing Co. With regard to the point mentioned by Mr. Tilston as to extra air not being admitted in sufficient quantities from normal to full throttle, I think he has been misled a little by the small diagrams drawn to show the double action of the piston slide. If Mr. Tilston follows the action of the slide in sketch No. 2 I think he will find that the extra air increases along with the throttle from normal to effective full throttle in the manner he considers requisite. In any case, it is only a matter of arrangement of slide and air and throttle orifices to get any required openings over the whole range of throttle.

I must particularly thank the Sphinx Manufacturing Co. for their remarks. They are good enough to say that my design would "embrace all the virtues of their own two-lever type." Without experiment I do not go quite so far as this, but I do think that it would be quite successful in small sizes as a lightweight carburetter.

It seems to me that there are distinct fields for three types of carburetters.

(1.) A simple single lever design for lightweights.
(2.) A double lever design for medium and heavy solos.
(3.) A single lever, more or less complicated, with two or three jets, for passenger work

Mine was merely an attempt to fill the bill for No. 1.

C. R. EASTWOOD.

THE RICARDO CROSSHEAD PISTON.

A Successful Design by the Inventor of the Slipper Piston.

READERS of *The Motor Cycle* will remember the new slipper-type piston introduced by Mr. Harry R. Ricardo in March last year, which was a very successful attempt at reducing piston weight and friction in internal combustion engines.

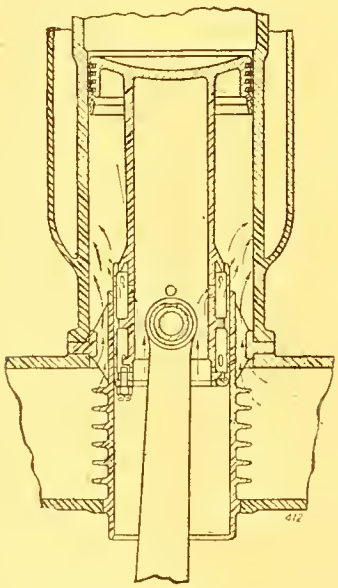
The authorities have now sanctioned the release for publication of details of another piston, by the same inventor, which has proved very satisfactory in practice since it was designed two years ago.

In the piston as we know it in the motor cycle engine, the body and skirt act both as a piston proper and a crosshead, and the large percentage of internal friction due to the piston is brought about by this crosshead function being performed in that part of the cylinder where the oil has a tendency to become carbonised.

In this new design the piston crown which carries the rings does not itself bear upon the cylinder walls. The crown is connected to a cast iron sleeve, which runs in a cylindrical guide, by a light tubular stem extending slightly below the gudgeon pin, which passes through it and floats in the sleeve bearings.

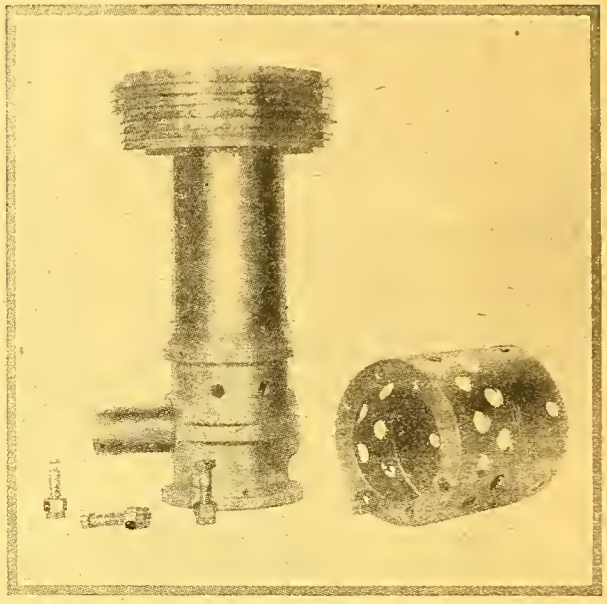
The sleeve guide, into which the sleeve is a close running fit, is spigoted into the cylinder and preferably white-metal lined.

It will be observed that, as the crown does not bear on the cylinder walls, a minimum of lubrication is required, and the crosshead and guide are exposed with advantage to the splash lubrication. It is found that, despite the fact that this type of piston is 30% heavier than the slipper type, the total friction is only about 80% of the slipper type and 60% of the ordinary trunk type.



The system of cylinder lubrication.

The lower portion of the stem, and the crosshead sleeve which surrounds it, are provided with a number of small holes, which are uncovered above the guide at the top of each stroke. On the upward stroke of the piston air is drawn through slots in the flange of the crosshead guide, between the guide and the cylinder, and passes at high velocity around the crosshead sleeve, through the holes in which it draws a small proportion of air and oil mist. This oil is sprayed on the cylinder walls while the piston is near the top of its stroke, and though minute in quantity is sufficient for the maintenance of the piston rings.

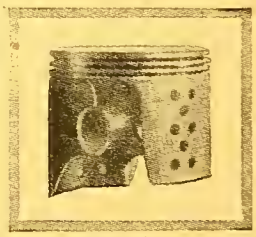


The Ricardo crosshead piston dismantled.

It may be objected that the weight of this type of piston is relatively excessive compared with the slipper type, and therefore the load on the connecting rod bearings is increased.

The principal reason, however, why a heavy piston entails low mechanical efficiency is not the increased loading on the connecting rod bearing, but that the inertia forces constitute a large proportion of the load of the piston on the walls, and hence of the piston friction. Here, however, we have this load transferred to a clean and well lubricated guide, and the piston friction being consequently reduced disposes of the chief objection to a heavy piston.

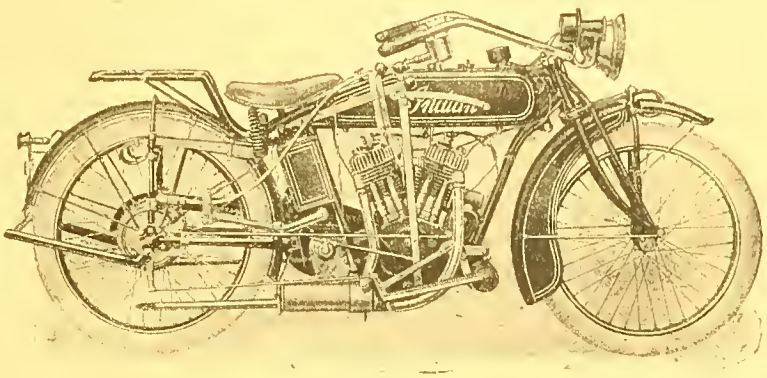
The advantages of the crosshead piston may be summarised as follow: (1.) Lubrication under control. Tendency to carbonise obviated and oil consumption reduced. (2.) Piston friction reduced 50% on that of trunk piston. (3.) Silent running. (4.) Ample lubrication, ensuring long life of crosshead and guide. (5.) Ample working clearance can be allowed between piston and cylinder without risk of noise. (6.) Wear on cylinder walls reduced to a minimum. (7.) No perceptible wear on gudgeon pin. (8.) Heat from the crown and crosshead guide can be utilised to warm carburetter air. (9) All working parts can be oiled thoroughly; also the oil remains clean. (10.) Restricted lubrication to cylinder walls prevents piston ring carbonising or gumming up.



The Ricardo slipper piston, designed primarily with the idea of increasing power by the reduction of friction and weight

The crosshead type of piston has overwhelming advantages in its favour, but it requires an engine specially designed to accommodate it, while the slipper type piston forms an efficient compromise, which has been more successful than was anticipated.

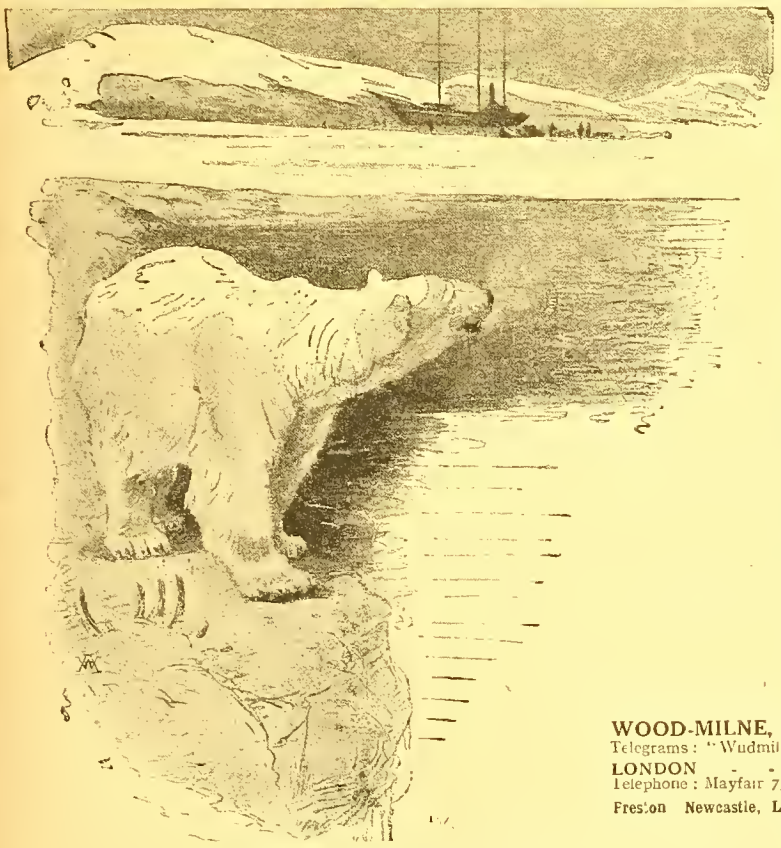
We regret that we are not in a position to supply motor cycles at the present time. But we can send a 1918 descriptive list on application. *This applies to Great Britain only.*



HENDEE MANUFACTURING Co.,
"Indian House," 366-368, Euston Rd., London, N.W.
Telephone: Museum 1643.
Telegrams: "Hendian, Euroad, London."
AUSTRALIA—109-113, Russell St., Melbourne.
CANADIAN WORKS—12-14, Mercer St., Toronto.
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 570, West St., Durban; Indian House, Strand St., Port Elizabeth

1918 **Indian** Powerplus

Electrically Equipped.



Discovery

Every great industry has its root discovery on which it has been built up. Far reaching as the results have been, there is little or none of the glamour which attends the efforts of the explorer—probably because of the lack of adventure and the secrecy so often necessary.

The rubber industry owes its present mammoth proportions to the discovery of the process of vulcanisation.

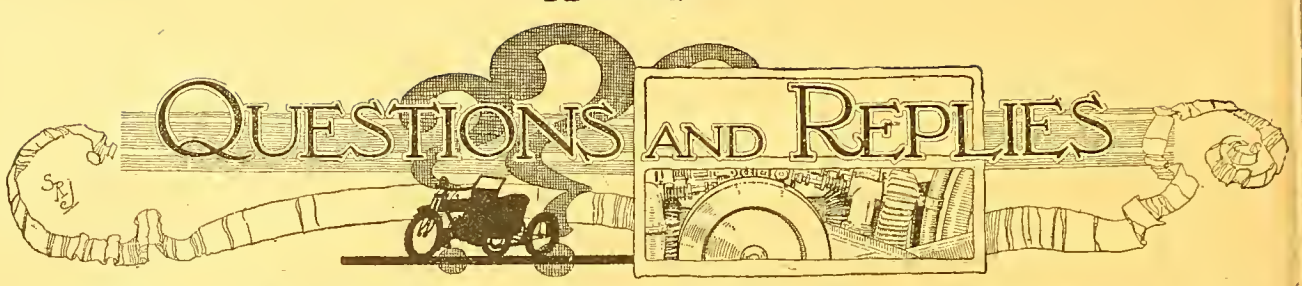
This was found by two men almost simultaneously—one in America, and the other in England. Chemists of all nations have built on the foundation they laid, and no more striking instance of the perfection obtained can be found than

Wood-Milne
British-made
Motor Tyres

The Hall Mark of Quality.

WOOD-MILNE, Limited, 21, Albion Street, Gaythorn, Manchester.
Telegrams: "Wudmiln, Manchester." Telephone: 8774 City (3 lines)
LONDON - - - - - - - - 42-46, WIGMORE STREET, W.1
Telephone: Mayfair 735, 6789, 6790. Telegrams: "Wudmiln, Wesdo, London."
Preston Newcastle, Leeds, Birmingham, Bristol, Glasgow, Dublin, Belfast, Vancouver Calcutta, Bombay, Johannesburg, etc.

In answering these advertisements it is desirable to mention "The Motor Cycle." A37



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Damage on Rail.

I have received by rail a motor cycle, which was considerably damaged. I have made a claim on the railway company, which they have refused, saying that the machine was consigned at owner's risk. Also some accessories were lost, but as they were not mentioned on the consignment note, no allowance can be made for these. Will you please say if I am in a position to enforce my claim?—T.J.

You cannot claim any compensation from the railway company unless you can prove that the damage was due to culpable negligence on the part of some of their servants. The attitude of the railway company in regard to the accessories is quite legal.

A Legal Query.

From enquiries and answers I have seen in *The Motor Cycle* I was under the impression that if I took my sidecar body off and had a special box made suitable for carrying, say, 1 cwt. of potatoes to my garden, I should not be called upon to pay the £1 tax. I might say that I informed the inspector of police of my intentions, and he said that I should have to pay the tax, but referred me to the Clerk to the County Council. I wrote them saying that I had constructed a box suitable for carrying seed or produce from the garden, and that I intended to have my name and address in 1in. lettering, etc., this box also to be used for conveying labour to help me work my garden. I am enclosing the reply from the clerk and should be pleased if you could inform me in what I did not comply with the legal conditions.—C.H.

The letter from the Clerk of the County Council appears to solve your difficulties. He states that exemptions are fully set forth on page 3 of the form, and we should imagine you ought to be able to tell if you are satisfying these conditions. While many authorities are very anxious to prevent any avoidance of payment of local taxation licence, they cannot decide the conditions under which exemptions will be granted. To avoid payment of a local taxation licence, a motor cycle and sidecar combination must be constructed and used solely for the conveyance of goods. If you carry a passenger on your machine you immediately break one of these conditions; consequently, you will be liable for the licence. If you do not carry a passenger you are not liable, and no local authority can compel you to pay the licence. If you have not already used your machine for carrying a passenger, and if you decide not to carry a passenger in future, you should communicate the circumstances of the case to the Auto Cycle Union or the motor cycle branch of the Automobile Association and Motor Union, who will doubtless take up the matter on your behalf with the local authority.

Timing an Old Engine.

I have an old pattern 2¼ h.p. Quadrant engine fitted with an automatic inlet valve. Could you tell me the correct timing for this engine? The ignition is by battery, and the contact breaker is worked off the exhaust valve cam.—A.E.S.

The exhaust valve should close immediately after the piston has reached top dead centre of the exhaust stroke. The piston should not have travelled more than 1 mm. down on the induction stroke before the exhaust valve has closed. The simplest method of timing the spark is to set the contact breaker two-thirds retarded and the spark occurring when the piston is on top dead centre of compression stroke. The inlet valve, of course, needs no timing.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD.

R.P.M.

I should esteem it a great favour if you would answer the following questions: Revolutions per minute all out and in good tune of a V twin; opposed twin; two-stroke; six-cylinder car engine; 10 h.p. four-cylinder light car engine; and average aero engine.—S.A.R.

The maximum r.p.m. of various types of engines depends entirely on internal design, but, taking averages, your answers may be approximately as follow: V twin, 3,000; opposed twin, 4,000; two-stroke, 2,500; six-cylinder car engine, 3,000; four-cylinder car engine, 4,000; and aero engine, 2,000. In all cases the above are about the maximum revolutions obtainable from each type of engine.

Carburetter Conversion.

I wish to convert a Douglas carburetter which has toggle arrangement into an Amac type of feed. Would you kindly advise me how to effect the change, and would it, in your opinion, be satisfactory?—C.J.R.

We do not think the change could be satisfactorily carried out, as it means the provision of entirely new needle valve mechanism. If the arrangement were carried out without any trouble it should be satisfactory in use, but it is a question if any advantage would accrue, and we think you would be better advised to leave the carburetter as it is or else obtain another carburetter altogether.

READER'S REPLY.

Remagnetising a Magneto.

I notice your correspondent "H.E.H." wishes to remagnetise his magneto. For a current of 110 volts make up the two coils (left and right-hand wound) of best insulated coil wire consisting of six pounds of 22 S.W.G. each. It is best to make a proper magnetising liner by winding the wire on two brass bobbins, made to shape, and in turn fixing them to a board. To make sure of the job when magnetising leave it for fifteen minutes. Do not switch on the current without a load.—J. P. J. CHAPMAN.

RECOMMENDED ROUTES.

BARKING TO SOUTHEND.—L.L.

Barking, Rainham, Aveley, Stifford, Horndon, Stanford, Vange, Hadleigh, Southend. About 35 miles.

EDINBURGH TO LIVERPOOL.—T.G.

Edinburgh, Penicuik, Romanno Bridge, Moffat, Ecclefechan, Lockerbie, Carlisle, Penrith, Kendal, Lancaster, Garstang, Preston, Ormskirk, Liverpool.

WESTON-SUPER-MARE TO SOUTHAMPTON.—F.G.

Weston, Highbridge, Bridgwater, Othery, Langport, Long Sutton, Wincanton, Mere, Salisbury, Landford, Totton, Southampton.

BIRMINGHAM TO ST. IVES.—C.R.V.

Birmingham, Alcester, Evesham, Teddington, Cross Hands, Cheltenham, Stroud, Nailsworth, Bath, Marksbury, Chewton Mendip, Wells, Glastonbury, Taunton, Wellington, Cullompton, Exeter, Taphouse, Okehampton, Launceston, Bodmin, Mitchel, Zelah, Redruth, Camborne, St. Ives.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed ——— & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

A.J.S. Lightweight, nice little machine, £23, lowest; also 3½h.p. T.D.C. 1914 engine, £16.—Brown, Rangemore Village, Burton-on-Trent. [X9245

1917 A.J.S. Combination, 6h.p., Lucas dynamo lighting and horn, hood, screen, speedometer, spare wheel, exceptional condition; £135.—Below.

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1916 A.J.S., 6h.p., lamps, horn, speedometer, perfect order; £80.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

A.J.S., 1916 (Sept.), 6h.p. Combination, extra heavy tyres, largest size head light, tail light, spare chains and valves, mileage 7,000; £95.—Box L7,522, c/o *The Motor Cycle*. [9150

A.J.S. 1914 6h.p. Combination, enclosed chains, hand and foot clutch, all in thorough order, 3 lamps, mechanical horn; evening or week-end; £60.—11, Gordon Rd., Church End, Finchley. [9188

A.J.S., 2¾h.p., 3-speed countershaft, excellent condition, speedometer, lamp, etc., £42; 2-speed ditto, £38; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [8750

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9189

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A.J.S., late 1913, 6h.p., 3-speed, Jones speedometer, electric lamps, spares include cover, several inner tubes (2 new), chains (new), and sundries, Gloria coach-built sidecar, with hood, screen, and luggage carrier, fitted with trunk; all in first-class condition, has been very little used during the war; price £105; can be seen by appointment.—C., 9, Grange Rd., Gunnersbury, W.4. [9165

Alldays.

1914 Alldays Matchless, 2-stroke, complete, perfect; £18.—Quenby, Park House, Hitchin. [X9235

RIDER TROWARD and Co., 31, High St., Hampstead.—Allon, 1916, 2-speed, 2-stroke; 29 gns. [9070

ALLDAYS Allon 2-stroke, in stock. Trade supplied. —Alexander's, 272, Gt. Western Rd., Glasgow. [9265

NEW Alldays, 2-stroke, 2-speed model; £46, complete; cash or deferred.—Harrods, Ltd., Brompton Rd., S.W.1. [9167

ALLDAYS Matchless, 1914, 3-speed, clutch, horn, new belt and tyres, 2-stroke, perfect condition; £27.—Humpidge, Amberley, Glos. [X9274

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8760

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

ARIEL, 3½h.p., variable gear, Bosch mag., B. and B. carburetter, complete with lamps, etc., in excellent running order; £20.—9, The Parade, Cambridge Rd., Norbiton, Surrey. [9156

Bat.

BAT-J.A.P. 5-6h.p. Twin, 3-speed, fast, combination, in splendid order; £40.—Fallon, Longfield, Rodwell, Weymouth. [9231

READ This.—3½h.p. T.T. Bat, torpedo tank, grand condition, less mag.; £10, or with nearly new C.A.V. mag., £14, bargain.—Barnes, 83, Trinity Rd., Tooting, S.W.17. [9212

BAT-J.A.P., 1914, 5-6h.p., 3-speed, tyres as new, electric or acetylene lamps, mileage 8,000, in very good order; 60 gns., or near offer.—Lieut. Kirkby, Mapleton, Worcester. [9151

RIDER TROWARD and Co., 31, High St, Hampstead.—Bat-Jap, 1914, 6h.p., 3-speed sporting model, re-enamelled, 39 gns., with 2-seater sidecar 45 gns.; Bat-Jap, 1910, 3½h.p., variable gear, 14 gns. [9073

Blumfield.

BLUMFIELD Engined T.T. Machine, 1915, 6h.p. special picked engine, very fast and powerful, in good condition throughout, and guaranteed; exchanges; 30 gns. (21).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9286

Bradbury.

RIDER TROWARD and Co., 31, High St., Hampstead.—Bradbury, 1913, 4h.p., 2-speed, clutch, re-enamelled; 32 gns. [9072

BRADBURY 4h.p. Motor Cycle, 1913 pattern, free engine, perfect order, completely overhauled; £35. —Apply, Co-operative Society, Ringwood. [9253

4h.p. Bradbury, 1913, Sturmey-Archer 3-speed, hand-controlled clutch, semi-T.T. bars, Bosch, B. and B., Sparton, knee grips, Autoclipse lamp, Watford speedometer, new tyres, belt, and spare cylinder; £32. —148, Crayford Way, Crayford, Kent. [9207

BRADBURY, 4h.p., 2-speed countershaft, chain-cum-belt, kick starter, new Watford speedometer, coach-built Mills-Fulford spring wheel sidecar, many accessories, all in perfect condition; accept £55 the lot.—Apply, 81, The Drive, Ilford (after 7 p.m., or by appointment). [9174

B.S.A.

3½h.p. B.S.A. 1912 or 1913 Motor Cycle; £20.—2 30, Babington Rd., Hendon, N.W.4. [9238

B.S.A., 1912, clutch model, Montgomery cane sidecar, wind screen, lamps, perfect order; £35.—Willis, 110, Harpenden Rd., Wanstead Park. [9224

B.S.A., late 1913, C.B. sidecar, splendid condition, all-chain drive and kick start; £30 only.—Lindfield, High St., Crawley, Sussex. [9199

4½h.p. B.S.A., 1916, 3-speed, clutch, kick starter, acetylene, electric lamp, aluminium footboard, excellent condition; £50, no offer.—Box 2,381, c/o *The Motor Cycle*. [X9269

RIDER TROWARD and Co., 31, High St., Hampstead.—B.S.A., 1916, 4¼h.p., 3-speed, all-chain, underslung coach sidecar, 65 gns.; solo, 58 gns.; B.S.A., 1916, 4¼h.p., 3-speed, chain-cum-belt, cane sidecar, 62 gns., solo 58 gns.; B.S.A., 1913, 3½h.p., 2-speed, clutch, pedal start, renovated, 32 gns. [9071

MOTOR CYCLES FOR SALE.

Calthorpe.

CALTHORPE 1915 2-stroke, 2-speed, countershaft; £23.—Queuby, Park House, Hitchin. [X9234

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

CALTHORPE-J.A.P., 2¾h.p., 2-speed, Sept., 1915, mileage 1,000, ready to ride away; £25.—Lieut., 669, Chester Rd., Erdington, Birmingham. [X9250

CALTHORPE-J.A.P., 2¾h.p. 1915 model, Enfield 2-speed, Senspray carburetter, all lamps, perfect running order; £23.—F. Tripp, Great Glemham, Saxmundham, Suffolk. [X9194

CALTHORPE, 2-stroke, 1915, 2-speed, knee-grips, Senspray carburetter, all lamps, good tyres, fine condition, very carefully used; £25.—Mebes and Mebes, 154-6, Gt. Portland St., W.1. [8708

CALTHORPE-J.A.P. Motor Cycles. Immediate delivery from stock. Trade supplied, no permits.—Alexander and Co., 115, Lothian Rd., Edinburgh, and 272, Gt. Western Rd., Glasgow. [9260

RIDER TROWARD and Co., 31, High St., Hampstead.—Calthorpe-Jap, 1916, 2-speed, sloping tank, clutch, 29 gns.; Calthorpe-Jap, 1915, 2-speed, clutch, 24 gns.; Calthorpe Junior, 1914, 2h.p., 2-speed, 18 gns. [9075

CALTHORPE. 1915, 2-stroke, 2-speed, just been overhauled, complete and guaranteed; exchanges; 25 gns. (20).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9284

Centaur.

RIDER TROWARD and Co., 31, High St., Hampstead.—Centaur, 1913, 3½h.p., 2-speed, clutch, handle start, 29 gns.; with sidecar, 34 gns. [9074

Chater-Jap.

8h.p. Chater-Jap Coachbuilt Combination, small parts want assembling; £25; good running order. —113, Blair St., Poplar, London. [9217

Chater-Lea.

CHATER-LEA, 8h.p. Combination, complete with accessories, very good condition.—Dr. Bates, Weymede, Byfleet, Surrey. [X9189

CHATER-LEA, 1914, 2-stroke, 2-speed, F.E., Amac, horn, lamps, etc., splendid condition; £22.—129, Grove Green Rd., Leytonstone. [X9168

Clyno.

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London. [8752

Connaught.

CONNAUGHT, single speed; £12.—F. Loesch, Barkhye, Heathfield, Sussex. [9138

1916 2¾h.p. Connaught, 2-stroke, 2-speed, as new, lamps, horn, tools, spares, not done 1,000 miles. —243, Stockport Rd., Ashton-under-Lyne. [X9060

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; ditto, new single speed, £34; ditto, 2-speed countershaft, £41; E.P. or exchange.—Service Co., 292, High Holborn, London. [8741

Coventry Eagle.

COVENTRY Eagle, new 2-speed countershaft, hand controlled, £44.—Service Co., 292, High Holborn, London. [8753

COVENTRY Eagle, 1915, 2¾h.p., 2-stroke, Thomson-Bennett mag., Senspray, Villiers engine, everything excellent condition; £20, or offer.—1, Campbell Rd., West Croydon. [X9253

De Dion.

2½h.p. De Dion Motor Cycle, Bosch mag., low built, good tyres, free engine model, good order throughout; £10.—W. Jones, 64, Rhosddu Rd., Wrexham. [X9218

Diamond.

DIAMOND-J.A.P. 2-speed, Enfield gear. Immediate delivery from stock, no permits, trade supplied.—Alexander's, 115, Lothian Rd., Edinburgh. [9262

Douglas.

DOUGLAS 1914 4h.p. Combination, perfect order.—13, Bassett Rd., W.10. [0960

DOUGLAS, 2¾h.p., 1915, good condition, accessories; 30 gns.—Dr. Hay, Sutton, Ely. [8905

1914 T.T. Douglas, 2-speed, lamps, horn, tools, fast, good order.—Hartshorn, Tickhill, Rotherham. [X9192

DOUGLAS.—Write us your requirements; either new machines or second-hand.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS Motors.—Send your name for waiting list now to Gibb, Douglas Expert, Gloucester. 'Phone: 852. [4749

DOUGLAS, 1916, 2¾h.p., perfect, accessories; £46. —Lt. Disney, R.A.F., Rossie, Kingston Hill, Surrey. [9241

DOUGLAS, 1914, 2-speed, complete with lamps, horn, and knee-grips, 36 gns.; 1916 ditto, 50 gns.; lady's ditto, £29; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [6739

RIDER TROWARD and Co., 31, High St., Hampstead.—Douglas, 1914, T.T., 2-speed, 34 gns.; 1915 T.T., 2-speed, re-enamelled, 39 gns.; Douglas, 1915, T.T., 2-speed, 29 gns.; 1911, 2-speed, 18 gns.; 1911, single speed, 13 gns. [9076

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Douglas.

LATE 1913 2-speed Douglas, new lamp, horn, new tyres, Dunlop heavy, tools, perfect condition, not used for 3 years; £33 cash; only wants seeing.—243, Stockport Rd., Ashton-under-Lyne. [X9061

Elf.

ELF 1¾h.p. Lightweight, only run about 500 miles, splendid condition, Bosch mag.; 14 gns.; exchanges (28).—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9292

Enfield.

ENFIELD 3h.p. Twin, 2-speed, good order; £29.—25, Greengate St., Stafford. [X9220

6h.p. Enfield Combination, dynamo lighting, good as new; £110, or offer.—75, High St., Thornton Heath. [X9174

ROYAL Enfield, 1912, 2¾h.p., chain drive, 2-speed, lamps, new chain, overhauled; £15.—1, Campbell Rd., West Croydon. [X9252

6h.p. Enfield Combination, hood, screen, speedometer, lamps, mechanical horn, in new condition; £80. —Oram, Colin Park, The Hyde, Hendon. [8974

1916 3h.p. Enfield Combination, twin, 2-speed, kick starter, Watsonian sidecar, good condition, accessories; £48.—Write or call, 3, Laurel Rd., Barnes, S.W. [9273

ENFIELD 1916 6h.p. Sidecar Combination, complete, just overhauled, £48; H.F. Multi-tube vulcaniser, 6 pressed complete with plates, fitted for gas, £4/10.—Cole, Ltd., Market St., Guildford. [8940

Excelsior.

BRITISH Excelsior Motor Cycles, 2-stroke and Jap models in stock; no permits, trade supplied. —Alexander and Co., 115, Lothian Rd., Edinburgh. [9264

BRITISH Excelsior, 3½h.p., 3-speed, Sturmey-Archer countershaft gear, brand new; £72; no permit required.—Alexander's, 115, Lothian Rd., Edinburgh. [9266

Flying Merkel.

BIG American Combination, 7-9h.p. Flying Merkel; £35; stamp, photo.—Robinson, Sandy, Beds. [9243

F.N.

RIDER TROWARD and Co., 31, High St., Hampstead.—F.N., 1913, 5-6h.p., 2-speed, clutch; 27 gns. [9077

Harley-Davidson.

1915 7-9h.p. Harley, electric model, Fulford sporting sidecar; £62; appointment.—53, Brownhill Rd., Catford. [9209

MOTOR CYCLES FOR SALE.

Harley-Davidson.

RIDER TROWARD and Co., 31, High St., Hampstead.—Harley-Davidson, 1915, 7-9h.p., 3-speed, dynamo lighting, disc wheels, hand and foot clutch, T.T. bars, kick start, just completely overhauled by makers and re-enamelled khaki, 69 gns.; Harley-Davidson, 1915, 7-9h.p., 3-speed, dynamo lighting combination, just overhauled by makers, 72 gns. [9079

Henderson.

HENDERSON, 1916, 8-10h.p., 4-cyl.; £75; part exchange entertained.—5, Victoria Av., Surbiton. [X9237

HENDERSON, 10h.p., 4-cyl., 1915 model, complete with sidecar, lamps, etc., a splendid combination; £87/10; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [8738

HENDERSON, 9-11h.p., 4-cyl., and coachbuilt sidecar, splendid condition, practically new tyres, Palmer cord and Dunlop heavy, Stewart speedometer; £80, or nearest offer.—Wright, 14, West Bay Terrace, Portland. [9230

HENDERSON, 1915, short wheelbase, complete with coach sidecar, the whole outfit has just been overhauled and is like new; guaranteed; exchanges considered; 89 gns.—The H.C. Motor Co., 347, Finchley Rd., N.W.3 (close to Finchley Rd. and Swiss Cottage stations). 'Phone: Hampstead 4631. [9285

Humber.

1912 Humber, 3½h.p., 2-speed, F.E., hand starting, with wicker sidecar; £18/10.—Plastow, Grimsby. [9130

RIDER TROWARD and Co., 31, High St., Hampstead.—Humber, 1913, 3½h.p., 2-speed, clutch, handle start, 24 gns.; ditto, 1911, 18 gns.; Humber, 1914, 2h.p. lightweight, 15 gns. [9078

Imperi.

2¾h.p. Lightweight Imperi, Precision engine, Arm-strong gears, tyres as new; bargain, £27, near offer.—W., 30, River Rd., N.19. [X9244

Indian.

1915 Indian Combination, 5h.p., lamps, horn; £50. —Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

1915 7-9h.p. Indian, guaranteed thoroughly overhauled, runs equal new; £45; exchanges with pleasure.—Palmer's Garage, Tooting. [9203

1915-16 7-9h.p. Indian and coachbuilt sidecar, hood, screen, 3-speed, spring frame, electrically equipped, in new condition, perfect; £75.—W., Rock End, Histon Rd., Cambridge. [X9172

LANCASHIRE District.—7-9h.p. 2-speed Indian combination, fast, low, sporty, long exhaust, last used 1916, late owner Overseas; urgent sale necessary; offers; any examination.—Lord, Mountfield, Prestwich, Manchester. [X9215

INDIAN 7-9h.p. 1916 Powerplus Combination, De Luxe sidecar, magneto, dynamo electric lighting outfit complete, 3 lamps, electric horn, speedometer, 3 speeds, hand and foot clutch, special leg mud screens, in perfect running condition, mileage approximately 5,500, tyres good order; trial Hereford; price £80, or near offer.—Box 2,350, c/o *The Motor Cycle*. [X8976

RIDER TROWARD and Co., 31, High St., Hampstead.—Indian Powerplus, 1916, 3-speed model, unscratched, 72 gns.; Indian, 1915, 7-9h.p., 3-speed coachbuilt combination, 59 gns.; Indian, 1914, 7-9h.p., 2-speed, coachbuilt combination, 52 gns.; Indian, 1916, T.T., clutch, 7-9h.p., 37 gns.; Indian, 1914, 7-9h.p., 2-speed, spring frame, 35 gns.; Indian, 1914, 7-9h.p., T.T., clutch, 29 gns. [9080

James.

1918 5-6h.p. James and coachbuilt sidecar, not done 500 miles, lamps, etc.; £85.—Wilkin and Co., Hunter's Bar, Sheffield. [9160

RIDER TROWARD and Co., 31, High St., Hampstead.—James, 1914, 4¼h.p., 3-speed, renovated, 34 gns.; James, 1914, 4¼h.p., single speed, re-enamelled, 29 gns.; James, 1917, 2-speed, 2-stroke, 32 gns. [9081

J.A.P.

4h.p. J.A.P. 1915 Engine, Bosch, Chater-Lea, single speed; expert examination invited; £25, or offer. —34, Fallows Court Av., N.12. [9201

Kelecom.

KELECOM, 3½h.p., m.o.v., Bosch waterproof mag., new tyre, dropped frame, and very low, T.T. bars, carrier, in guaranteed perfect order; magneto worth the money; £12.—Seen at Butterworths' Garage, 64, Mill Lane, Brixton Hill. [9194

Kerry.

RIDER TROWARD and Co., 31, High St., Hampstead.—Kerry-Abingdon, 1914, 4h.p., single speed; 22 gns. [9082

Lea-Francis.

1915 Lea-Francis, 3-speed, lamps, horn, speedometer, as new; £60.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

LEA-FRANCIS, 1914, 3½h.p., 2 speeds, 1916 carburetter, complete with all accessories; what offers? —Box L7,371, c/o *The Motor Cycle*. [8792

1915 Lea-Francis, 6h.p. J.A.P. engine, kick starter, chain drive, Bosch mag., lamp, horn, and tools, guaranteed in working order, little used since 1916; price £45 by appointment.—21, Beauclere Rd., The Grove, Hammersmith, W.6. [9176

NOVEMBER 7TH, 1918.

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Speed Gear Control.

THE letter by "A." on the subject of three or four speeds in *The Motor Cycle* of Oct. 24th sets forth the theoretical and practical advantages of the four-speed gear so fully that little need be added to his comments. The advantages he details apply more fully to the high-revving type of engine, which promises to enjoy some popularity, than they do to the heavy touring type, and speed merchants should become attentive when the question of four-speed gears is raised. With the high-revving, light-flywheel type of engine the third speed, giving a ratio near to top gear ratio, is an absolute necessity if maximum results are to be obtained, and very often it may prove advantageous to shift from top to third when travelling at a speed in the vicinity of 30 m.p.h.

With this state of affairs dawning upon us, and considering the clumsiness of the present gear-changing method, it behoves manufacturers to depart once more from car practice and to start out on lines of their own. At present we have to declutch with one hand and remove the other from the bars when changing speed—a lengthy and often difficult operation when speed and road conditions are against it. Something better might be arrived at—something that would prove a blessing to the trials competitor and a comfort to the nervous solo rider. It may seem a comparatively small point to those accustomed to normal roads and normal machines, but in mountainous districts, especially when one is mounted on a machine of the Brough or A.B.C. type, much better results could be obtained if one could retain full possession of the bars during the crucial instant of changing. This disadvantage is very apparent with a three-speed box, and more so with a four, since one changes at higher road speeds, and for that matter we have met many nervous solo riders who are wont to hang on to top gear longer than they should because they are timorous—unconsciously perhaps—of relinquishing their hold of the bars except at low speeds—particularly on rough or greasy roads—a trying operation at the best under such conditions.

The Sturmey-Archer system is a step in the right direction. Owing to the gear being spring operated, it is possible to move the gear lever into position before the change is actually made—the gear remaining in engagement till the load is released either by lifting the exhaust valve or (preferably) easing the clutch, neither of which operations necessitates removing the hand from the bars to operate the change speed lever at the moment when full control is most desirable. Thus, theoretically, one puts the lever into middle gear position at the bottom of the hill, and on nearing the hairpin bend one effects the change by the movement of a finger. The great objection to the arrangement is that a bad jolt often causes the gear to change automatically when the transmission is under full load, which is bad for the machine throughout and disconcerting to the rider.

There is no reason why the clutch lever, in addition to controlling the clutch, should not control also a safety catch on the gear box, so that until the catch is moved by the action of declutching it is impossible for the gears to change. Not only would this make good the one defect in the present Sturmey-Archer arrangement, but it would further render the gear box more or less foolproof in the hands of the dud rider. On approaching a hill we should engage the third speed while on the level, effect the change on the bend by a simple easing of the clutch with throttle more or less open, and, having rounded the corner, we could, at our convenience, shift the lever into top or second gear position, confident that the next change would be made in the same easy manner—by manipulation of the clutch.

The provisions for carrying this suggestion into effect need only be very simple—the safety catch consisting of a more or less crude lock, which is inevitably thrust back or aside by the movement of the clutch arm.

An index to the advertisements in this issue will be found on the page facing the back cover.

LOOKING AHEAD.

AN APPEAL TO MOTOR CYCLE MANUFACTURERS.

RECENT events in the war zone and elsewhere have given rise to a fairly general belief that hostilities may cease much earlier than was supposed. Pondering over the situation as it exists at the moment of writing, and the possibilities which may arise therefrom, I have endeavoured to picture in my mind what change, immediate or future, the motor cycle industry will undergo when the peace we all desire becomes an accomplished fact. It is my privilege frequently to discuss with leading members of the trade, both car and motor cycle manufacturers, their post-war plans, and it is clear that much careful thought and study are being given to this all-important subject, for the British are resolved that Britain must resume without delay her pre-eminent position in world trade. Briefly, my own impressions are that car manufacturers are much more advanced in their plans than motor cycle manufacturers, and it is to draw attention to this all-important question that these notes have been penned.

In the car world I hear of cut and dried selling policies of cars specially designed and tested, and of the necessary jigs and tools (which alone spell successful quantity production) actually produced. French, Italian, and American manufacturers, too, are looking ahead, and if my information is correct —and it comes from most reliable sources—our Allies are not one whit behind the go-ahead British manufacturers in their post-war plans.

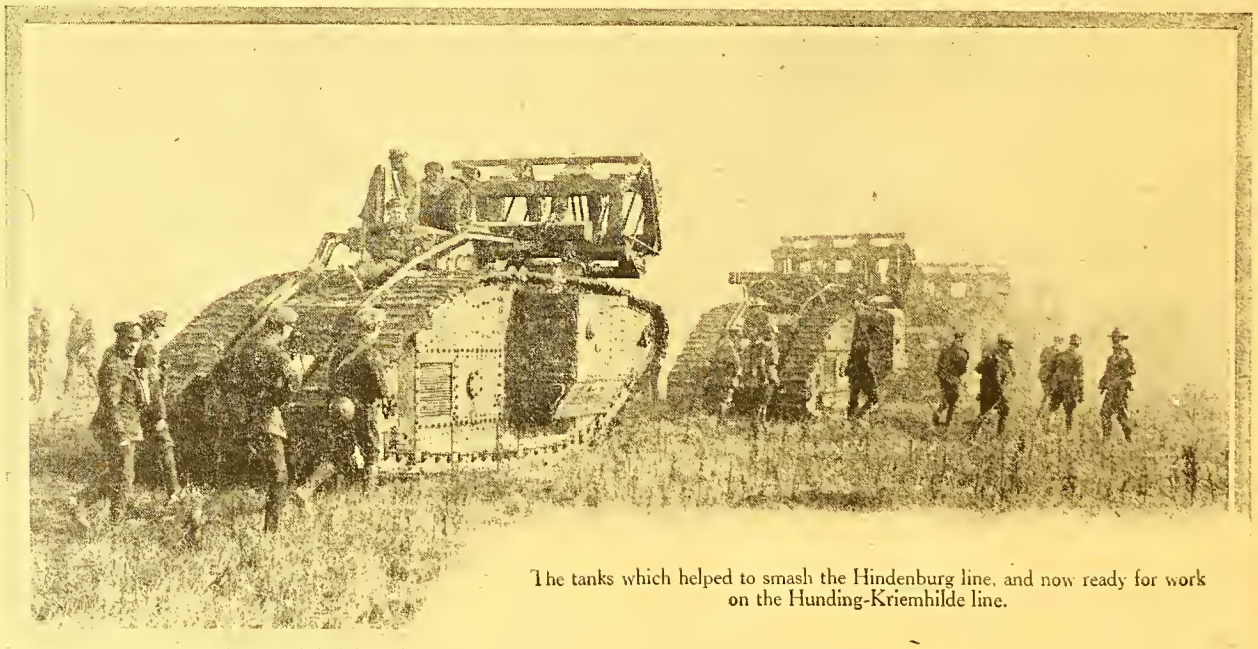
But supposing peace were declared in the near future, could motor cycle manufacturers proceed without delay upon a policy already adopted after long and matured consideration? In the main, I fear not. The more energetic have prepared plans, some of the most attractive order, but I cannot refrain from recording my conviction that many are pinning their faith to pre-war patterns, with sundry improvements such as have been proved to be necessary. I should be the last to urge changes for change's sake, but we have progressed too rapidly for much reliance to be placed in the pre-war designs; the war has taught us many useful lessons, and we must not fail to take full advantage of them.

First, design is the problem for the trade, and not merely design from the point of view of appearance. The design of post-war models must necessarily carry a much broader meaning, it must be combined with ease of production, and it is this point which will determine more than any other factor the ultimate success of any new model. Next comes the workshop side of the programme. Much improvement is possible over pre-war methods, and I cannot believe that any ambitious manufacturer will fail to study war-time quantity production methods in allied trades and to take full advantage of them. Lastly, selling policy demands very careful consideration, and this must be on a much more extensive scale than heretofore.

Such in brief are the three essential points of post-war manufacture, and they must be more closely interconnected than has been the case up to the present time. The successful combination of the three factors named will spell (1) standardisation and interchangeability of parts; (2) ease of production with a consequent reduction in selling price; (3) systematic distribution, which will please users and result in accumulated benefits for the manufacturer.

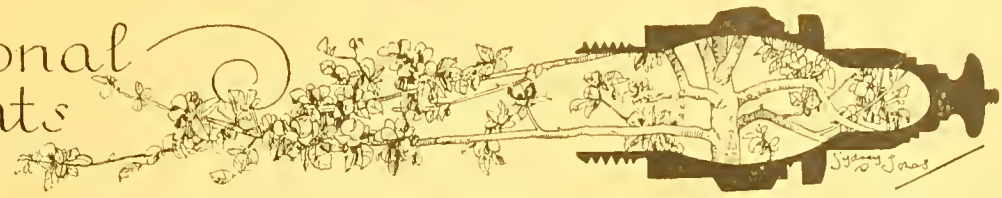
Without diverting attention one jot from the immediate and essential task of winning the war, motor cycle manufacturers should now study and determine post-war plans, so that a definite programme may be actually in being when the happy days of peace return.

A RIDER OF MANY PRE-WAR MODELS.



The tanks which helped to smash the Hindenburg line, and now ready for work on the Hunding-Kriemhilde line.

Occasional Comments by "Ixion"



Price?

THE hard-headed pessimists always tell us that cost will place all the new aero stunts clean outside the range of motor cycling. I admit that the present prices of aluminium and Duralumin and copper and sundry high-grade steels would make platinum blush. But everything novel fetches fancy prices, until the supply is organised. Time was when the buck motorists wandered to Cannstatt and paid Herr Jellinek umpteen thousands for a forty Mercédès, which was little more than a very noisy and cumbrous edition of the modern 8 h.p. Rover, except that it was infinitely more expensive to run. When the Haskell golf ball first came across, moneyed sportsmen paid £2 for one ball, and their language when they sliced it into gorse from the second tee—but I spare you. Anyhow, the other day somebody was warned off Westward Ho! for dunting the greens by playing cut mashies on to them with a resurrected Haskell. History will repeat itself with the tensile aero alloys when they appear. Chancellors will talk of substituting the new metal for gold in the currency. Society beauties will wear pendants of them. Aged duchesses will have their teeth filled with them. The special polished Rolls-Royce Olympia chassis will have its radiator cap made of them, and three plain clothes men on the prowl near it all the week. Ten years later they will make bootscrapers of it. So the world wags.

Does a Sidecar Skid?

SOME while ago I ventured the assertion that a rigid type of sidecar chassis does not skid. Incredible as it may seem to some of my correspondents, I had never until the other day seen a rigid sidecar execute a manœuvre worthy of the opprobrious term skid, nor in all the miles I have driven had I experienced one. Yesterday two of us, both on sidecars, were proceeding at a highly illegal speed over very greasy wood pavement; not to put too fine a point on it, we were racing all out. Suddenly an obstruction threatened, and we both braked as hard as we knew how. My companion, whose chair was empty, did a magnificent pirouette, turning through an arc of ninety degrees to his left, and then ditto to his right, finally sliding along crabwise and regaining control. My own 'bus, which had 12 stone in the chair, did not skid at all, though its driver was considerably less expert than the other. I must obviously eat my words of long ago. Need I eat them further than to rephrase the dictum thus, "A sidecar does not skid provided the chair contains plenty of weight?" When my remark appeared, several correspondents informed me that they had suffered hair-raising skids whilst coasting sidecars down steep hills on greasy surfaces. I did my best to provoke such a skid during the following week, but without success. Perhaps I should add that I have eschewed sidecar work to the best of my ability, so my experiences are not as crisp as they might be.

An Engine on Novel Principles.

ONE of the latest invention yarns concerns us rather closely. Do not be surprised if existing engines are presently superseded by a complete novelty. We are promised on unusually credible authority an engine which is said to be silent and vibrationless, and quite uncommonly economical in respect of fuel. More I dare not add for fear of Dora: except to say that big men of reputation are behind this stunt, which is not the usual wild cat fairy tale, and has already proved itself in two other phases of industry. However, there is no need to give up dreaming about your post-war mount. Quickly as we now hope the war may finish, the new engine will not reach the commercial stage as soon as that.

Henry Ford and the Cheap Cycle Car.

"SERGEANT R.A.F." does bare justice to the genius by which Henry Ford has cut the price of his cars. According to the Ford people's own experience, output is not the decisive factor. Their works are now capable of producing over 300,000 cars per annum. If they were content to turn out about thirty cars per day, they could reduce the cost of each chassis a trifle; and the giant output is dictated by the desire to earn huge profits, not by the desire to produce the cheapest imaginable car. Nor is our soldier correspondent quite in the right when he adds "concentration on one point" as the second item in the Ford ticket. Concentration on three points would be nearer the mark, viz.:

(1.) Securing the best available brains in the American industry.

(2.) Encouraging the hands to co-operate towards maximum production.

(3.) Cutting down the labour required for each individual operation to the absolute minimum.

On a similar basis, the cycle car outlined by "Sergeant" could be produced in this country at a less price than the 1914 light cars fetched, and that on an output of, say, thirty cycle cars per day, an output for which customers could readily be found. But shows like the Ford Company do not grow in every street. He would be a bold man who would aim at getting the necessary thousands of mechanics to work as the Ford hands work, since restricting output is a common principle in British labour. He would be a bold man who should hope to mass a staff as brainy as the Ford staff for the manufacture of thirty cycle cars a day—the resultant profits would not run to the necessary salaries. In other words, "Sergeant's" dream comes through the ivory gate. In this tight little island, where the population limits output to small figures, such a concern—if it every materialises—will not make cheap cars: it will make costly cars in order that its profits may cover the salary list. The moral of all this rigmarole is that, if ever a particular make of super-cycle car makes good, it will be very much simpler than our gallant friend's specification.

THE SIX-STROKE ENGINE.

A Study of the Advantages and Disadvantages of an Interesting Type of Engine.

By GEORGES FUNCK, A.M.I.A.E.

While four-stroke and two-stroke engines are more or less familiar to all, the six-stroke engine has so far received little attention either in the press or in practice. Indeed, it seems curious to mention the six-stroke engine at the present time when there is a tendency to reduce the idle strokes as much as possible. Nevertheless, a study of the six-stroke engine, with its peculiarities, is beneficial. The advantages which certainly do exist over the four and two-stroke engine may well recommend such an engine for special purposes.

ANY conception of a new working cycle has its origin in the search for one or another improvement. For the internal combustion engine the improvements arrived at may be brought under the general headings of (1) thermal efficiency, (2) specific h.p. per cubic capacity, and (3) specific h.p. per weight of engine.

Reducing the manufacturing cost may often have stimulated modification, as in the case of the three-port two-stroke engine, while improving the mechanical efficiency and reliability are undoubtedly included in the above points.

Six-stroke Scavenging Engines.

Fig. 1 diagrammatically illustrates the Rollason engine, in the design of which increased thermal efficiency was the aim. It is well known that in a four-stroke engine it is not possible to clear the explosion chamber, which in a normal engine is about 25% of the volume swept by the piston. The exhaust residue, of course, has a detrimental effect on the incoming charge, on account of its heat and its pressure being generally slightly above atmospheric pressure. These two reasons prejudice the volumetric efficiency of the suction stroke. Then during the explosion these inert gases affect the perfect and rapid combustion. Furthermore, the value of the compression space cannot be utilised for new mixture, as we cannot get rid of the residue and replace it by effective explosive mixture during the ordinary induction stroke. Also, as is well known, the compression is limited to that of the pre-ignition point, which, of course, occurs sooner if the inlet charge is heated before and during compression. For these reasons, Mr. Rollason proposed to include two extra strokes between the exhaust stroke and suction stroke of the ordinary four-stroke engine. During the whole of these two extra strokes an extra valve (shown in fig. 1) is mechanically opened, and the cylinder interior has free access to the outside air. The piston, therefore, will during the down stroke take fresh air into the cylinder and during the up stroke expel it again. It will be seen that most of the remaining exhaust gases are expelled, and the cylinder is scavenged in such a perfect way that all waste gas is cleared out completely.

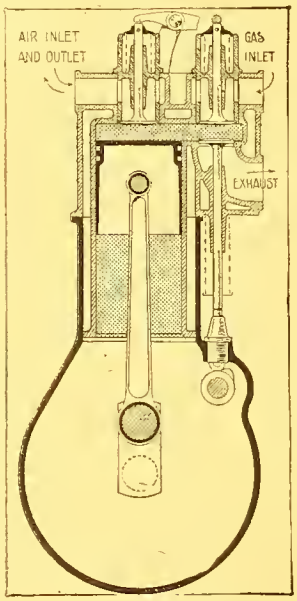


Fig. 1.—Rollason's six-stroke scavenging engine.

Interesting experiments with an engine of this description were carried out by Prof. Burstall. The thermal efficiency of the engine proved to be 25%, but, as was to be expected, the power was less than for a four-stroke engine of the same size. The engine used for the tests was a three-cylinder engine 127 × 146 mm. bore and stroke, representing a cubic capacity of about 5,500 c.c. The power developed by the engine at 717 r.p.m. was only 14 h.p., while the R.A.C. rating is 30 h.p.

An improvement with regard to the thermal efficiency had certainly been obtained, but the power output was undoubtedly very low, and the weight of such an engine per h.p. outweighs the advantage of the improved petrol consumption.

The Supercharged Six-stroke Engine.

The engine as proposed by Mr. Rollason is capable of an improvement by a simple method. If instead of introducing two perfectly idle strokes we pump into a special receiver the air, or, better in this case, mixture, during the up-stroke, and keep this charge in readiness to supplement the ordinary suction stroke, we shall be in a position to increase the power of the engine considerably as we effect a true supercharge.

To illustrate this more plainly we may refer to fig. 2 and follow the cycle of operations one by one. Supposing the piston is at the end of the compression stroke and the explosion takes place, the piston goes downwards, and at the bottom of the stroke the exhaust valve is opened and remains open during the upward stroke, the exhaust valve then closes and the inlet valve is opened to admit mixture while the piston travels downwards. At the bottom of the stroke the inlet valve is closed and the transfer valve is opened, and as the piston rises the charge of the first suction stroke is pumped into the receiver. At the end of the upward stroke the transfer valve is closed and the inlet valve opened once more, allowing another suction stroke to take place. At the end of this suction stroke, where the piston almost reaches the bottom, the inlet valve is closed and the transfer valve is opened for a very short period round the bottom dead centre. As the previous charge, under pressure in

The Six-stroke Engine.—

the receiver, will flow back into the cylinder, it supplements the existing charge. Hereupon begins the compression stroke, ignition, etc.

We may thus enumerate the strokes as follows: (1.) Expansion stroke. (2.) Exhaust stroke. (3.) First suction stroke. (4.) Pumping stroke (into receiver). (5.) Second suction stroke. (6.) Compression stroke.

Before considering the details of the various advantages and disadvantages of this cycle, it will be advisable to go into a few points which may give rise to misunderstanding.

It may be asked first how is it possible that the whole charge of the first suction stroke contained in the receiver can return under its own pressure into the closed cylinder, thus increasing the pressure inside it? The answer to this is that we must consider these operations being performed after the engine has run a little time, and the balance of pressures has taken place. It is evident that after that time the total amount pumped into the receiver after the first suction stroke must return back into the cylinder at the end of the second suction stroke. Should there remain a certain amount behind in the receiver, it is evident that the pressure inside the receiver would gradually increase, and there must arrive a point in which the balance of pressures takes place, and the ingoing and outgoing quantity will be exactly the same. It will also be realised that the efficiency of the second suction stroke is largely dependent on this receiver pressure on account of the space of the combustion chamber.

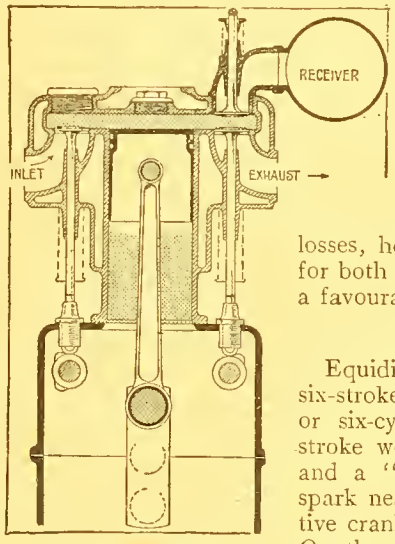


Fig. 2.—A supercharged six-stroke engine.

Advantages and Disadvantages.

We may now consider the advantages to be gained from this modified six-stroke engine. We have seen that the whole of the first suction stroke is being transferred back into the cylinder at the end of the second suction stroke, therefore we may assume for a moment that we have before compression a double charge present in the cylinder, which if effectively employed would give off double the power of a single charge during its expansion.

Theoretically, the power production in favour of the six-stroke engine is in the proportion of 4 to 3, or 33% power increase. This is quite an appreciable gain of power well worth considering. The conditions are purely theoretical, and are for an ideal engine; but its theoretical value should not be depreciated, as we can thus see the extreme limit of the six-stroke. The second suction stroke is not, however, of such good value as the first, and the amount of mixture drawn in depends on the receiver pressure, which in turn depends on its capacity. First, the mixture in the combustion space after the pumping stroke expands during the second suction stroke to atmospheric pressure before any new mixture is taken in. Then during the pumping stroke we absorb a certain amount of power, part of which will be lost during the double transfer. These are the two main causes which affect the ultimate power increase, and the theoretical limit case of 33% can never be reached in practice. Under certain circumstances it would be advisable to reduce the compression which, in turn, affects the power output.

In the space available it is not possible to go into the question of pressures, sufficient it is to say that the pressure at the end of the compression stroke must be considerably higher than that of a four-stroke. The explosion pressure would probably reach 800 lb. per square inch as compared with 350 to 400 lb. of a four-stroke engine. This will show that an engine designed to run under the conditions outlined would have to be much heavier than a four-stroke engine for the same cubic capacity.

As regards the thermal efficiency of the six-stroke engine, we note that the explosion takes place in a space surrounded by the same wall surface and at the same temperature as for the four-stroke, and we may presume that the same amount of heat will be absorbed by the walls. The quantity of heat, however, is abstracted from twice the quantity of gas, and, therefore, the relative loss would only be 50% of that lost in a four-stroke engine. The exhaust losses, however, remain comparatively the same for both engines, and we shall, therefore, expect a favourable increase of thermal efficiency.

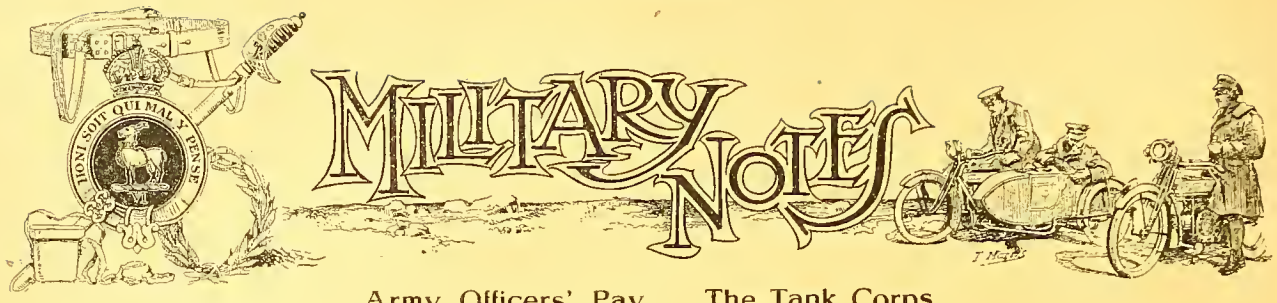
Firing.

Equidistant power strokes with multi-cylinder six-stroke engines can only be obtained with three or six-cylinder engines. A three-cylinder six-stroke would approximate to an opposed twin, and a "six" to a "four." We require the spark near the upper dead centre of the respective cranks, which are set at 180° to each other. On the other hand, a standard magneto gives a spark every 180° of the armature, and the most straightforward proposition will be to connect the magneto directly to the engine shaft, *i.e.*, run it at engine speed. We shall, however, obtain two sparks too many. The easiest proposition is to short these two idle sparks on a distributer geared 3 to 1. With coil ignition there will be no difficulty.

Other Peculiarities.

Unfortunately, space does not permit us to go into further interesting points in the six-stroke engine, such as what effect the size of the receiver is likely to have on the running of the engine, and whether it is advisable to provide a separate receiver to each cylinder or to make one combined receiver, or what would be the advantages of an eight-stroke engine on a similar principle with a power increase of 50%?

These points have to be left for the reader to answer. It is not intended in these notes to show that the six-stroke engine is in any way an ideal engine. The advantages have certainly been brought into prominence, but any reader will soon form his own opinions as to its disadvantages, as, for instance, the inferior quality of the torque, the extra complications, the highly stressed parts, the weight, etc., but this should not prevent study of this interesting engine, and in some fields its advantages will undoubtedly outweigh its disadvantages.



Army Officers' Pay. The Tank Corps.

ARMY OFFICERS' PAY.

IT is notified in an Army Council Instruction just issued that, with regard to officers, in reckoning service for the purpose of increased pay, periods served in a temporary rank will count, but service in acting rank will not count.

SEC.-LT. D. S. COX.

SEC.-LT. D. S. COX is a very old member of the motor industry and an exceptionally keen motor cyclist. He recently came before the notice of our readers as the inventor and manufacturer of Cox's patent gas trailer, one of which was used by a member of our staff and was commented on in an issue of *The Motor Cycle*.

He has just been granted a commission, and is acting as workshop officer in the A.S.C., M.T. His business as a dealer in second-hand motor cycles and cars at West Norwood is being carried on by his manager, late of the A.S.C., M.T., who has been discharged after service in Mesopotamia.

Lt. D. S. Cox, A.S.C., M.T.

THE TANK CORPS.

AN Army Order dealing with the Tank Corps states that officers for the corps will be obtained (1) by the grant of commissions to selected cadets from the Tank Corps Officer Cadet Battalion; (2) from officers seconded or transferred from the Regular, Territorial, and Reserve Forces, and New Armies. Officers seconded or transferred will take seniority in the corps in accordance with the substantive rank they hold at the time, and all officers will join the corps in their substantive rank.

All promotion will be regulated by the War Office. For the purposes of promotion the approved establishments will be divided into three branches: (1) Executive, (2) Engineer, (3) Equipment. Temporary promotions up to the rank of major to fill vacancies on the establishment in each branch will be given from time to time to officers in order of seniority, provided that those next for promotion are recommended as being in every way fitted for promotion. Temporary promotion to the rank of lieutenant-colonel will be by selection, with due regard to seniority in each case. Should an officer next on the list for promotion not be recommended, the full reasons for his supersession will be stated. The name of an officer who has been passed over for promotion will again be brought forward for recommendation when the next promotions are made. The names of officers recommended for accelerated promotion may be forwarded from time to time in special cases where an officer is considered specially suitable for such promotion by reason of long or distinguished service in the corps or for some exceptional reason. Acting rank may be granted to officers in the corps.

The "Technical Section" of the corps will comprise tank engineer officers provided in the approved establishments of the corps.

The "other ranks" of the corps will be warrant officers, non-commissioned officers, and men transferred from other units, when necessary, and of recruits. They will be transferred in their permanent ranks. Promotions or appointments to acting rank will be governed by the regulations for the Machine Gun Corps.

SILVER WAR BADGE.

MR. MACPHERSON has informed Sir H. Greenwood that soldiers discharged as "time-expired" have never been eligible for the award of the silver war badge. The badge is awarded only to those who have been discharged from the Army on account of old age, wounds, or sickness, and is in no sense a commemorative war medal.

MISSING.

WE regret to learn that Cpl. Eric Williams, of the Tank Corps, has been posted missing. Nothing has been heard of him since March 24th last, when his tank was disabled at Bapaume. We hope, however, the worst that has happened to this enthusiastic motor cyclist is that he is a prisoner of war.

SEC.-LT. J. COCKER.

SEC.-LT. J. COCKER, M.G.C., a well-known competition rider in pre-war days, and who joined the No. 5 Battery of the Motor Machine Gun Service as a private in 1914, writing from a London hospital, says: "You will probably be interested to know that I am now recovering from serious wounds received at Ypres last May, and hope to be on my feet again in about three weeks' time. I hope my injuries will not prevent me from competing in many events in the near future."

HONOUR FOR LT. F. A. McNAB, R.N.V.R.

WE recently had a letter from F. A. McNab, the well-known competition rider, who has been discharged from the Navy physically unfit, but has been granted the privilege of retaining his rank of Lieutenant, R.N.V.R., for life, and his name will be permanently retained in the quarterly Navy List.

McNab, as most of our readers will remember, was a brilliant performer on a motor cycle in competitions before the war, and has nine 500 c.c. records to his credit and over fifty firsts in races.

A group of despatch riders in Palestine. Note the heavily-laden motor cycles, every available inch being occupied with luggage.

A PELMANIST REGRETS.

By GEORGE HENRY.

I always think that regret is one of the most vain and irksome emotions in the life of a man. It has the knack of making itself felt at the most inopportune moments, and, however the circumstances of one's life may alter, it never seems to wholly die.

I think I shall carry one regret with me for a very long time; but I shall not be alone in so doing, for there are many thousands of men who (I know by the evidence of their own writings) have moments in which they are goaded by the same regret which is my portion—the regret that they had not become Pelmanists sooner.

I have read thousands of letters from Pelmanists—thousands *literally*. Most of them have a story of success to tell. And it is just because they have to tell of ambitions realised and hopes fulfilled that their pleasure in their achievements is to some extent tempered by the regret almost unfailingly evidenced at the end of their letters—"I wish I had known of Pelmanism years ago."

I suppose most Pelmanists, looking back on their lives before Pelmanism came to them with its splendid faculty of illuminating understanding, live over again moments, days, and years when the lessons of the "Little Grey Books" might have been to them as counsellors and friends helping them to pick out the right paths in this maze of a life that we live.

I know that I do. I have written elsewhere of how Pelmanism helped me to bridge the gulf that opens up between the military life and the resumption of civilian activities. I am, indeed, thankful for the guidance that Pelmanism gave me, and the mental reconstruction the system made possible; but I, nevertheless, cannot help regretting that Pelmanism did not sooner come to me. If anybody had convinced me of the value of Pelmanism, *while I was in the Army*, I should have much for which to thank that somebody.

The war—perhaps because it has become a long war—has revolutionised the mental attitude of the general public in regard to the soldier. It has entirely eradicated the old tacit belief that Tommy in the ranks was quite content so long as his physical needs were satisfied. It is now realised that the "single (or married) man in barracks," although he doesn't "grow into no plaster saint," can have higher aspirations than are comprised in the "banker"—canteen—nursemaid cycle of red-coat days.

Tommy in the last four years has come to know the meaning of intellectual hunger. In the lotus-eating hours 'twixt "Retreat" and "Lights Out," when the voice of the orderly-sergeant has hushed for a while and the camp has emptied, Tommy has come to feel the pangs that come from inadequate provision of sustenance for the mind. No use to be introspective. That brings nostalgia and the disastrous impulse that leads at last to C.O.'s orderly-room and the fatherly regard of the N.C.O. in charge of defaulters. It is mental occupation with a positive purpose that is badly needed.

And if you think the cinema and concert party are a sufficient antidote to the mental stagnation of military life then read this extract from a letter written by a soldier on the Western Front to the Editor of an Educational Magazine:

"*What Tommy needs to make him happy,*" *he wrote,* "*is not canteens—wet or dry—helpful as these may be; not concerts or cinema shows; but something to give healthy exercise to his mind. And it is because so many soldiers have realised this that they have taken up Pelmanism. . . . None but those who have seen can realise what it is for a man's mind to be unoccupied.*"

This might well be the collective expression of the opinion and thought of a great army of men; for in the Navy and Army at the present day there are over 100,000 officers and men devoting every possible moment to the study of the System that is so signally revolutionising the thought of a whole nation.

They sought something to satisfy the appetite for thought engendered by monotony, and in Pelmanism they found that which they sought—and much more. They regret now that they were not Pelmanists in the days before the gesture of a king, "dressed in a little brief authority . . . like an angry ape," upset the decencies of life. They realise how much fuller, how much more satisfying their conception of life might have been if they had been led by Pelmanism to know themselves and the potentialities of the marvellous machinery of the senses and the mind.

So, then, it comes about that Pelmanism is more than a spare-time occupation of charm and interest for the Service Man. It has resolved itself into self-discipline, self-culture—an earnest preparation for the time when he can again go about his affairs in a reasonably satisfactory world.

I have said that I regret I did not take up Pelmanism sooner.

I shall feel sorry for the man who can say that—sorry for the man who has neglected to prepare—when war has given place to peace.

Tributes to Pelmanism.

Major-Gen. Sir F. Maurice, K.C.M.G., C.B.:

(Late Director of Military Operations.)

The Pelman system provides mind-drill based on scientific principles, and taught by experienced instructors. It claims to produce not only a good memory, but concentration, self-confidence, self-control, initiative, and observation, and the thousands of letters received from soldiers who have taken the course, both before and during the war, show that it makes no empty claim.

I can think of no better method than the Pelman course either for keeping the mind fit in times of leisure or slackness, or for restoring mental vigour to a soldier whose mind has become flabby from overstrain or physical weakness, and I can recommend no better investment than a Pelman course to the soldier on convalescent leave.

The Pelman system is not cram, or trick, but a scientific method of training which has proved its value to the soldier in war, and it would, I am certain, be of the greatest benefit if it were adapted to Army training generally.

Sir R. S. S. Baden-Powell, K.C.B.:

I have been asked many times whether I recommend Pelmanism, which is a system of mental training taught by correspondence. I cannot base a recommendation on *personal* experience of the Pelman course, because I have never been through it myself; and I have made it, I am glad to think, my invariable rule throughout life never to recommend a man or a measure with whose merits, achievements, and possibilities I had not had personal experience.

This rule, however, leaves me quite free to say that the Pelman System, so far as I can judge from what I have seen of it, appeals to me because it deals with the individual, and because it offers to him in a practical form the cardinal steps to the development and strengthening of mental character, which is the foundation of success in any line of life. And many, if not most, of these steps are those which have been omitted in the average school training.

"Mind and Memory" (in which the Pelman Course is fully described, with a Synopsis of the lessons) will be sent, gratis and post free, together with a full reprint of "Truth's" famous Report on the Pelman System and a form entitling readers of "The Motor Cycle" to the complete Course for one-third less than the usual fees, on application to the Pelman Institute, 199, Pelman House, Bloomsbury Street, London, W.C.1.

The Fables of Fame

The Seventh.

In days before the war a monster of tremendous speed and power was driven over the country by its owner and his friend. To all who watched the spectacle the question always came, why such a giant vehicle when only "*two*" desire to travel? The answer was as follows:

These motorists know that light cars—at least the bulk of them—were somewhat comfortless unless "*each*" seat they carried had an occupant. They did "*not*" know, however, of the pleasure that a certain Motor Cycle and its sidecar could provide. Had they done so and realised as well that such a "mount" could give them wondrous speed, could penetrate the spots a heavy car could never reach and cost them a fraction of its upkeep, they'd have travelled on the

CLYNO

THE Sidecar Motor Cycle

which is built to carry two, which runs so smoothly that it gives the comfort of a car, which is so compact that it does not need a spacious garage, and so economical that one marvels at its deeds.

Here's the Clyno Post-war Policy—

Mass Production of One Model (8 h.p.).
Competitive Prices of both Outfit and Spares.
And Strictly Rotational After-war Deliveries.

THE CLYNO ENGINEERING CO.,
Pelham Street, WOLVERHAMPTON

1874

CURRENT CHAT

SPECIAL FEATURES

THE SIX-STROKE ENGINE. SPRING FRAME MACHINES.
THE "PEACE" MODEL.

TIME TO LIGHT LAMPS

GREENWICH TIME.

Nov.	7th	... ...	4.53 p.m.
,,	9th	... ...	4.49 ,,
,,	11th	... ...	4.46 ,,
,,	13th	... ...	4.43 ,,

American Motor Cycles.

The total average for the country demonstrates that 15% of the motor cycles manufactured were used for recreative, and 85% for utility, purposes.

Comparisons.

A Road Board "high authority" is reported to have stated that it will cost £90,000,000 to put the roads of the United Kingdom right again. Dear, dear! Why, we could have ten or twelve days more of glorious war for the money! —*The Irish Cyclist and Motor Cyclist.*

Petrol for Disabled Soldiers.

We have been informed by Mr. A. W. Torkington, chairman of the National Motor Cyclists' Fuel Union, whose good work on behalf of munition workers is well known to our readers, that the N.M.C.F.U. is about to extend its activities on behalf of disabled soldiers with a view to obtaining for them an allowance of petrol, and thus enabling them to carry out their duties and obtain at the same time what is very necessary to many of them, viz., fresh air.

Warning to Motor Cycle Owners.

W. H. Drew, of The Gardens, West Harrow, informs us that he has been the victim of an impudent fraud, and desires to warn other motor cyclists against a similar fate. He says: "There is a man going about dressed in A.S.C. uniform, dark, tall, and having two top teeth of gold, who is stealing motor cycles by a smart fraud. He obtained from my house on Thursday, October 31st, a clutch model 3½ h.p. Premier motor cycle, which has just been re-enamelled both frame and tank, and fitted with new tyres—a Kempshall on the front wheel and a Dunlop on the back—Bosch magneto, and B. and B. carburetter; engine No. 1610. The machine was advertised in *The Motor Cycle* on October 31st, and his method to obtain possession was to call with a note written on a billhead of the local cycle and motor agent saying he had left his Service machine with the agent and was authorised and backed up by the agent to try the motor cycle in question for a major. He obtained a bill for some small parts from the agent, erased what was written, and wrote the fraudulent guarantee. Please warn your readers, as I should not like other motor cyclists to be 'had' as my wife, unfortunately, was."

The Industrial Reconstruction Council.

The fourth lecture of the series arranged by the Industrial Reconstruction Council will be held in the Saddlers' Hall, Cheapside, E.C.2, on Wednesday, November 13th. The chair will be taken at 4.30 by the Right Hon. Lord Burnham, C.H., and a lecture entitled "A Retrospect from 1970" will be delivered by Sir Arthur Steel-Maitland, Bart., M.P., Parliamentary Secretary Foreign Office and Board of Trade (Department of Overseas Trade). Applications for tickets should be made well in advance to the Secretary, I.R.C., 2 and 4, Tudor Street, E.C.4.

Waste Rubber.

The Ministry of National Service, the Salvage Department of the War Office, and the British Red Cross have completed a scheme for the salvage of waste rubber for war purposes. Mr. J. S. Henry, the official in charge of the arrangements at the Ministry of National Service, recently stated that an appeal was being made for any waste rubber in the possession of members of the public who are willing to give it to the nation for the purposes of the war. Old motor car, motor cycle, and cycle tubes are specially mentioned, and the War Office has agreed to purchase the rubber at a satisfactory price. The proceeds will be given to the Red Cross.

Tuning Up.

There will most probably be some "tuning up" of motor cycles this winter. Let us hope so anyway! If things go on as they are doing, what about a Peace Christmas and a trial to celebrate it!

A Moon Chart.

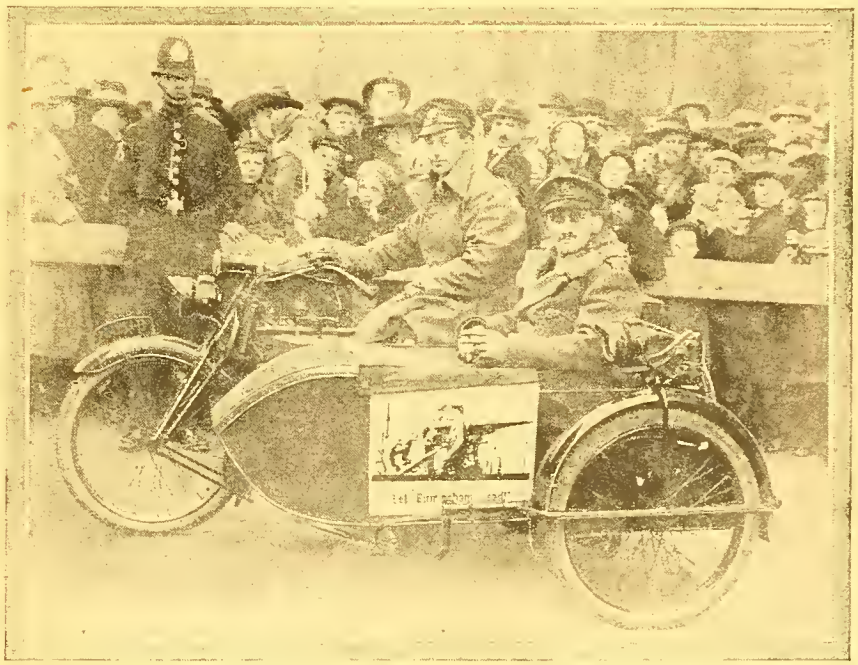
We have to acknowledge the receipt of Messrs. Vandervell's useful moon chart for the month of November, compiled by the company's chief engineer, Mr. A. H. Midgley.

The N.M.C.F.U.

A meeting of the members of the Sheffield District of the National Motor Cyclists' Fuel Union was held at Empire House, Sheffield, on October 26th, to celebrate the anniversary of the founding of the Sheffield branch of the Union. It was followed by a most excellent concert.

Great satisfaction was expressed at the excellent work carried out by Mr. A. W. Torkington on behalf of the Sheffield munition workers, for whom he had procured petrol, and a valuable presentation was made to him in the shape of a polished oak box containing 106 pieces of the best Sheffield plate and cutlery.

Altogether there are some 800 active motor cyclists in the Sheffield district, and of these 675 are members of the N.M.C.F.U.



Capt. J. Rigden, R.G.A., in charge of Group "C" Big Guns now touring England in aid of War Bond weeks in the various large towns. The machine is a 4 h.p. Douglas.

THE MOTOR CYCLE

AVIATION SECTION

Women Aviators. Airmen's 2,000ft. Fall. New R.A.F. Club.

Women Aviators.

A movement has been started in Rome for the organisation of an Inter-Allied air squadron of women.

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Parachutes for France.

Major Baird states that sufficient progress with experimental parachutes for use for aeroplanes has been made to justify their provision for certain types of machines. The policy is to provide them first for machines in use in France.

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Aerial Post between Egypt and the Sudan.

The Times Cairo correspondent telegraphs that the possibility of establishing after the war an aerial postal service between Egypt and the Sudan is being much discussed.

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Carbide as a Fuel.

Experiments are being conducted at Messrs. Nielson and Winther's aeroplane factory, Copenhagen, with a motor fuel made from carbide. A Danish engineer, Herr Carsen, of the Danish State Railways, originated the idea, and experiments have lately been made by him with the new fuel. If the results correspond to expectations a factory will be erected for its production. The costs of production are now high, and up to the present time carbide as a fuel for internal combustion engines has not been an unqualified success.

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The Aeronautical Institute.

The Aeronautical Institute of Great Britain has, in conjunction with the O.U.T.C. scheme for the education of officers unfit for general service and discharged officers, made an arrangement whereby a special course in aeronautical engineering will be available for disabled or convalescent officers of His Majesty's Forces and those of Allied countries. It is intended that instruction will be given in practical mathematics and mechanics, mechanical drawing and design, the elements of practical aerodynamics, the internal combustion engine, the air-screw and its adaptation to aircraft, the design and construction of aeroplanes, and the strength of materials applied to aeroplane construction. These will be under the direction of Mr. L. Blin Desbleds, hon. director of the Aeronautical Institute, and will extend over a period of three months, while those who join will be made to feel that they are receiving the individual attention which their health in previous training or experience demands.

The fee for the course will be £5 5s., payable in advance. Enquiries should be addressed to Capt. Lisle Watson, adjutant O.U.T.C., London Branch Office, 11, Commercial Road, Peckham, London, S.E.15.

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Motor Cycles Help U.S.A. Airmen.

There is a big aviation training camp at Love Field, Dallas, Texas, and, to allow the work of the repair depôt of the aerodrome to be carried on efficiently, a large fleet of motor cycles is employed.

When an airman makes a landing, his machine may come to a stop two or three hundred yards from its hangar, and to save the aviator from walking that distance, as soon as the plane touches the ground a squad of motor cycles and sidecars goes straight to it, carrying mechanics to look after the aeroplane and put it back in its shed, while one of the machines picks up the pilot and takes him to the instructor.

An observer in a tower watches for forced landings, and as soon as one is noticed he informs the officer in charge of the motor cycle squad, and a machine and mechanic are despatched to give such assistance as may be desired.

The Royal Air Force Club.

Lord Cowdray has given £100,000 for the establishment and endowment of a new club to be called the Royal Air Force Club. His lordship, who was first Air Minister, hopes that the new club will be housed in a building worthy of the Service, and a memorial of its work in the war.

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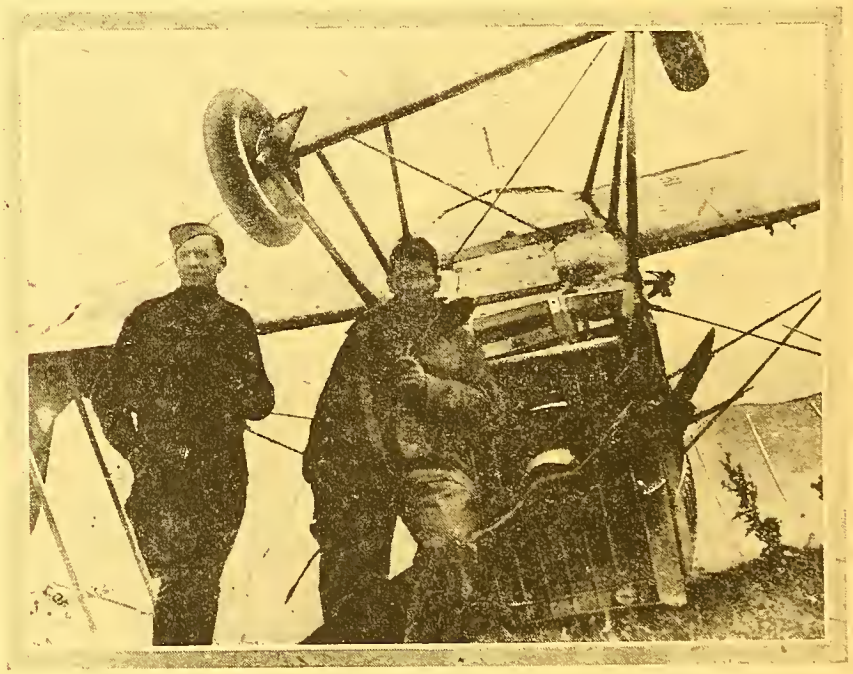
Aeroplane Journeys in the Balkans.

Mr. G. Ward Price recently returned from Sofia to Salonica by air in two hours. Before the war the journey by train took two days. The British staff officers in the Balkans make more use of aeroplanes than the officers of any other army. A conference may be needed, for instance, with the Commander of an Army Corps, whose headquarters are eighty miles away. To motor there and back over the rough Macedonian roads would take the whole day from dawn to dusk. Instead, the Commander-in-Chief, or his Chief of Staff, will start during the morning by aeroplane, arrive in one hour, have an hour's conference, and be back at General Headquarters by one o'clock.



WITH THE AMERICAN AVIATION SECTION IN FRANCE.

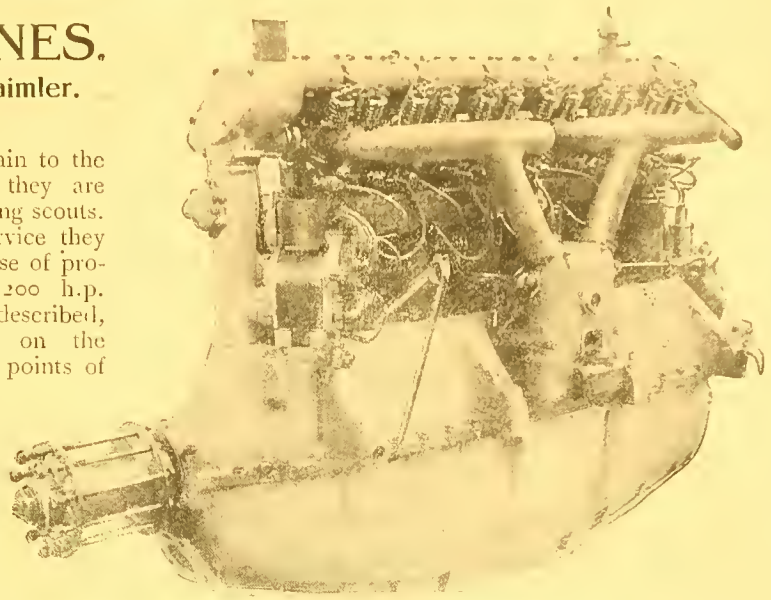
Two American airmen who fell 2,000 feet after a German bullet had cut a strut wire on their 'plane. Except for a severe shaking up neither was injured.

HUN AERO ENGINES.

No. 1.—The 200 h.p. Austro-Daimler.

DESCRIBED BY "TORQUE."

THE Germans are still faithful in the main to the vertical six-cylinder type, although they are now using a few rotaries on their fighting scouts. After four years of experience on active service they continue to put the emphasis of design on ease of production and general staunchness. The 200 h.p. Austro-Daimler six-cylinder, now to be described, was shot down in an Austrian scout on the Italian front last April, and presents a few points of general interest. The weight is 728½ lb. without oil or water, *i.e.*, 3.64 lb. per b.h.p. The timing gears are arranged in a neat but unusual fashion. The overhead camshaft is driven by a vertical shaft at the front of the engine, and the drives for the two magnetos are taken in a backward pointing < from the base of the camshaft-driving shaft; space is thus provided for a V radiator between the propeller and the front cylinder, without resort to a long nosepiece. The water pump spindle is driven at an upward angle from the rear end of the crankshaft, and the oil pump is inside the crank case.



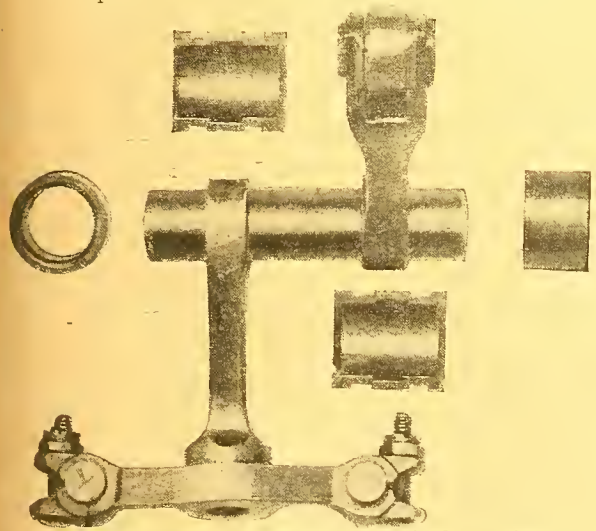
The 200 h.p. six-cylinder Austro-Daimler aero engine. Its weight is 728½ lb., *i.e.*, 3·64 lb. per b.h.p.

Believers in overhead valves may be interested in the familiar Austro-Daimler dodge for obtaining accessibility. There are four valves per cylinder, viz., two exhausts and two inlets. One inlet valve of each cylinder is fitted in a detachable cage or pocket. To get at the valves without dismounting the cylinder the mechanic removes the detachable inlet valve, frees the springs of the other three valves, lowers the piston to the foot of its stroke, and fishes out the three remaining valves through the orifice left by the removal of the detachable inlet valve pocket.

The lubrication system is also novel. Seven gallons of oil are carried in the sump, and ceaselessly circulated by the main pump, thus lubricating the crankshaft bearings. A small auxiliary pump draws oil from a separate tank cast in the crank case, and forces it through the hollow overhead camshaft. The oil which escapes from the camshaft drains down into the sump, and compensates for the gradual reduction of the main supply whilst the engine is running. The crank case weighs 207 lb., *i.e.*, nearly a third of the total engine weight, and is of quite complex design. The bottom of the sump is heavily ribbed from front to back, and an aluminium cover is screwed over the ribs, so that the main oil supply is kept cool by a strong current of air. The oil consumption is seven pints per hour. By contrast, the carburetter is very thoroughly heated. The whole of its air supply is drawn from the oil-cooling chamber through a passage cast in the side of the crank case. The throttles are surrounded by a cast aluminium chamber, forming a "breather" for the hot air rising from the crank case; the top of the carburetter is heated by a water jacket, and the induction pipes are heavily lagged with asbestos. The petrol consumption is about fourteen gallons per hour.

To facilitate starting, a "decompressor" is provided. Each exhaust cam is formed with a "partial lift" auxiliary cam, and these starting cams are brought into action by moving the camshaft bodily endways by means of a suitable lever.

The cylinder barrel is machined complete with the head from a steel forging. The water jacket is built up of sheet steel, acetylene-welded into position, and corrugated to permit of expansion under heat. Two



The valve rocker which actuates each pair of inlet or exhaust valves.

The aluminium alloy piston. It is ribbed internally for cooling and stiffening purposes.

Hun Aero Engines.—

sparking plug bosses and three valve pockets are welded into position, the fourth valve pocket being held down in a shouldered recess by a locking nut.

The pistons are of cast aluminium alloy, their crowns being ribbed starwise internally for cooling and stiffening purposes. The gudgeon pin bosses are lined with cast-in steel bushes, and the gudgeon pin is located by a split pin, the ends of which pass vertically upwards through a steel-bushed hole in one of the bosses, and are then expanded inside the hollow gudgeon pin.

A single rocker actuates each pair of inlet or exhaust valves as the case may be. Each rocker consists of a central spindle with arms projecting on each side. The inner arm carries a roller which engages the cam; the outer arm is T shaped, and hard screws are locked in the split ends of the cross-piece by clamping bolts. The valve clearances are set by means of these screws. The two exhaust valves of each cylinder must be set to open at precisely the same instant, otherwise the valve which opens first will overheat and distort.

The crankshaft weighs 96½ lb.

The engine can be accelerated for brief spurts up to 1,600 r.p.m., at which speed it gives 222 b.h.p., and it runs very smoothly from 1,600 r.p.m. down to 700 r.p.m. Marked vibration is apparent at 500 r.p.m., which is its minimum speed for practical purposes.

GROUND STRAFING.

A Mode of Warfare which has proved Exceedingly Useful.

TOGETHER with the science of bomb dropping a second "Hun-harassing" device has made its appearance, to wit, ground strafing. Started by a few boisterous youths in the old F.E. or battle-plane squadrons, who used to make half-hearted dives at the Hun trench lines, this method of warfare was first brought into prominence by the exploits of Lt. (now Major) Bishop, who carried out an extensive patrol over enemy territory, incidentally shooting up an aerodrome, at an average height of 100 feet.

Since then ground strafing has progressed by leaps and bounds, and has become one of the most important, if not the most important, of a scout's duties. So much so, in fact, that a few days ago, when Fritz was massing a division to repel our attack on the Wotan Line, he was forced to send up a circus of nineteen planes to defend it.

The Take-off.

Let us then journey to France and watch the work of these "ground strafers."

It is a morning in early September. The sun has just risen, lighting up the great jagged masses of cloud floating lazily some 3,000 feet overhead. A gentle breeze just stirs the tree tops.

Out on the aerodrome mechanics are busy putting the last bombs into the bomb racks. A little group of pilots are discussing the routes they will take over Hunland, so that each group of three machines will have another group in sight, and will be able to go to its assistance if necessary. Everything settled, the pilots make their way to their machines. The engines are started. A few seconds' running up shows that every engine is "revving" sweetly. The leader waves the mechanics to remove the chocks from under his wheels, glances round to see that the other two machines are ready, opens out his engine, and takes off. Climbing rapidly in the still morning air, he soon reaches 4,000 feet, where he is above the clouds, throttles down his engine a bit, and makes for the lines, his two companions side by side and behind him in the form of a V. Soon he is passing over the shell-torn trenches of old battle grounds, and a muffled thump, thump shows where the "heavies" are going full out below. Reaching the front line, he turns and flies parallel to it for a few minutes, scanning the skies to the east for the white flicker of wings which will tell him the positions of Hun formations.

Scattering the Huns.

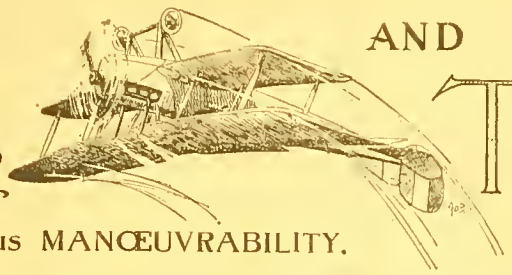
Everything, however, seems quiet, so under, or rather over, the cover of a large cloud he slips into Hunland. Once well over the lines he turns into the open and starts to scan the roads and fields for movement. "Archie" immediately opens up and gives him a fairly warm time. He knows now that he must get his job over fairly quickly, as "Archie" at that height will attract any Hun formation within sight of it. At first he can see nothing, but suddenly under a hedge below him he sees a dark blur. Shutting off his engine he turns and dives. As he gets lower he is able to distinguish a mass of men lined up under cover; about 1,000 strong he would judge them to be. Edging to one side so as to enfilade the whole line of the hedge, he puts his engine half on and goes down in one tremendous dive, both guns stammering out their 800 rounds a minute.

Down, down, down, till he is scarcely 100 feet above them; four quick tugs at his bomb release and he pulls up in a tremendous climbing turn, only to dive again and send another stream of lead down at the demoralised mass. His eye glued to the Aldis sight, he is nearly hitting the fleeing men this time before he pulls out. Then engine full out, ammunition practically exhausted, he makes for home with a goodly bag of Huns to his credit.

But getting home is not nearly so simple a matter. He is down at 400 feet now, and specially trained bands of machine gunners are making his journey most unpleasant. Slipping sideways, diving, climbing, he gradually makes his way towards the lines, watching with an anxious eye to see that the other two machines are untouched. Far away in the east a cloud of black dots announces the arrival of a Hun patrol. He is close to our lines now though; a steep dive, and the cessation of the rat-rat from the machine guns at last announces that these have been safely crossed. Dropping to within a few feet of the ground he careers over the heads of the waving infantry back to his aerodrome and—a drink.

H.W.S.

FLYING FACTS AND THEORIES



SPEED versus MANŒUVRABILITY.

By W. G. ASTON, A.E.R.A.e.S.

THERE is a very prevalent idea that to be effective in air fighting an aeroplane must be, above everything else, extremely fast. The notion contains a good deal of truth, but, whilst being nothing but the truth, it can hardly pretend to be the whole truth, for the plain fact of the matter is that speed *per se*, whilst of great value in enabling one to outclimb or outpace an enemy and so escape a fight, becomes of less value when the issue is joined and the machine-guns begin to stutter. It is at this juncture that manœuvrability is seen to become a determining factor, so that, briefly, one can say that of two different machines of comparatively equal speed, the one that can manœuvre quickly will stand the better chance in a scrap. The thing to do is, of course, not only to get your gun quickly on to the vital parts of the hostile 'bus, but to have the capability of dodging about so rapidly that the other Johnnie never gets a chance to draw a bead on *you*.

Loading.

It is probably well known that some machines wallow about in the air much as a waterlogged derelict wallows about in the sea; whilst others, not necessarily faster, nor even as fast, are light and "nippy," answering the slightest touch on the part of the pilot, and manifesting a willingness to perform all sorts of stunts with no difficulty whatever. The difference between these two classes of aeroplane may be divided roughly into three causes—(1) loading, (2) size of controllable surfaces, and (3) moments of inertia.

Taking these in their order—which I do not submit is necessarily their order of importance—loading is a factor of consequence, inasmuch as it determines the time which an aeroplane takes to flatten out after an "all out" dive. The heavier the loading the greater the radius of the turn, and the same also applies to horizontal turns. Again, a very heavily-loaded machine (loading is expressed as the number of pounds weight supported by each square foot of lifting surface) will not have as good a speed range as one more lightly loaded, although it may actually have a greater ultimate speed. In other words, a heavily-loaded machine cannot indulge in stunts to the desired effect, inasmuch as these stunts would involve it in stalling and losing height. This, of course, is a disadvantage; most stunts involve loss of altitude, but the less you lose in fighting the better.

Area of Controllable Surface.

The second point is possibly of less importance than it would appear, as beyond a certain point there is no advantage to be gained by increasing the area of controllable surfaces; in fact, if carried out to excess this principle becomes dangerous to an almost fatal degree. And for this reason, personal fatigue comes into the equation. Big surfaces can only be controlled by a big effort on the part of the pilot, and such effort may be easily more than he can put forth repeatedly in the space of a few minutes. It is essential, therefore, that, however manœuvrable an aeroplane is designed to be, it should impose the least possible tax upon the physical endurance of the pilot. In the big German multiple-engine Zeppelin bombers I understand that the ailerons, elevator, and rudder are so heavy to work that *two* pilots are required, working side by side, to fly the machine. One readily sees that if called upon to put up a fight such an aeroplane must rely entirely upon its armament, and has no chance whatever of evading its pursuers.

Moments of Inertia.

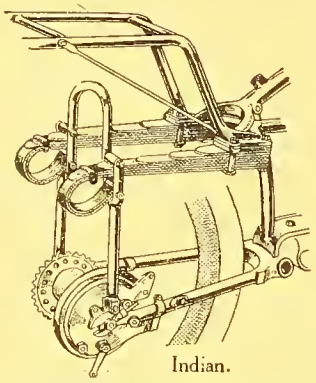
But, apart from that, the important point to note is that, regardless of the controlling surfaces, the extent to which an aeroplane can be pitched, rolled, and spun depends upon the weights and disposition of its component parts. Supposing you had, for instance, a great massing of weights towards the wing tips, so that when the aeroplane rolled it had to overcome a very great inertia effect, in this event big ailerons would be of little avail, and if big enough they might be caused to break the wing spars rather than accelerate what is the equivalent of a huge flywheel. In order to get great manœuvrability, therefore, it is essential to have the principal weights as close together as possible, so as to reduce the moments of inertia in the various planes concerned. Thus it is easier to make a quick turn on a single-engined machine than on one in which two engines are fixed between the wings, one on each side of the fuselage.

Balanced Control Services.

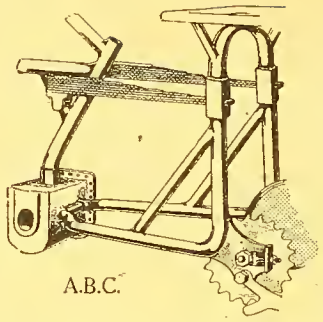
For the sake of reducing the amount of personal strength demanded, it is common to find balanced control surfaces fitted, in which there is a small surface projecting forward of the hinge so as to assist the action, instead of resisting it, when the whole surface is worked through a small angle. The effectiveness of controlling surfaces is also enhanced when they are placed immediately in the wake of a flat, fixed surface. It is sometimes said that a stable machine is necessarily slower on its controls than an unstable one, but this is not necessarily the case, though it may occur if the design carries stability to excess. In machines that are constructed primarily for stunt flying and for great quickness of manœuvrability a reasonable degree of stability merely calls for slightly more effort on the part of the pilot—which it may, of course, save him in straightforward flying—but, unless this quality is developed very highly, it will not prevent him from making the machine perform rapid evolutions.

MotorCycl

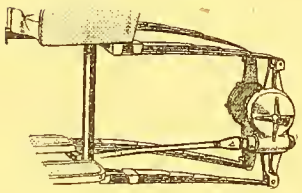
A BRIEF REVIEW
MARK



Indian.



A.B.C.



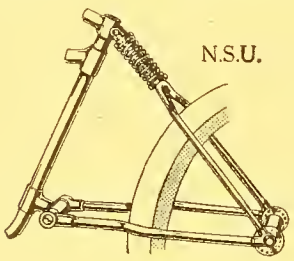
T.A.C

SINCE spring frames represent one of the most important problems facing present-day motor cycle designers, a brief review of more or less well-known makes of machines embodying them will probably be an interesting addition to the several reviews of designs which have appeared in *The Motor Cycle* this year.

The Present Position.

It is impossible, in the space available, to include all spring frames that have been made by the many private experimenters who have adapted springing devices to their machines; hence, with one exception, only those produced by motor cycle manufacturers are dealt with here.

It may come as a surprise to the reader to note that there are so many makers who have shown sufficient interest in the springing problem to produce a spring-frame model. The average motor cyclist thinks that "three or four" covers the field. In this article over a dozen well-known makers are represented by illustrations, excluding American and Continental designs. This alone is proof that attention to the springing problem has not been lacking, for which *The Motor Cycle* campaign undoubtedly is, at least partly, responsible.

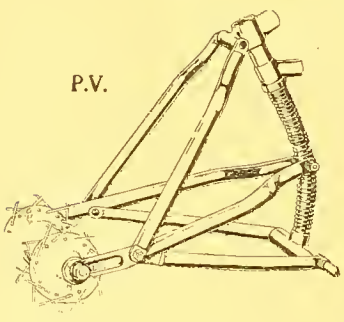


N.S.U.

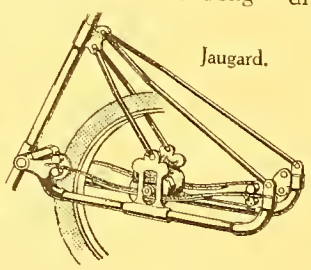
In addition to these British machines, there are illustrated the Indian, Pope, N.S.U., and Jaugard machines produced in other countries, and the several so-called spring frames, which are not devices to spring the entire frame. Among these may be mentioned the Bat and Edmund types, both of which were designed simply to insulate the rider from road shock, and no effort was made further to reduce unsprung weight.

There is also another machine justifiably placed in the spring frame category, *i.e.*, the A.S.L., in which road shocks are absorbed by a pneumatic device. The objects, of course, are identical with those of spring frames, and therefore it should be counted among spring-frame machines produced in this country.

Of the several British designs illustrated, it is interesting to note that seven employ quarter-elliptic, one has half-elliptic, and one cantilever leaf springs, making nine all told against six embodying coil springs.



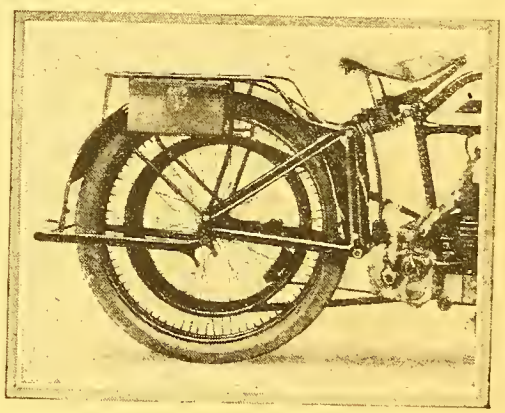
P.V.



Jaugard.

Coil and Leaf Springs.

Designers well qualified to judge assert that every result obtainable by leaf springs can be secured by the use of coil springs. Therefore it is somewhat surprising that the latter have not been used more, especially as they are lighter—a point which one would think would carry certain force with designers of motor cycles.



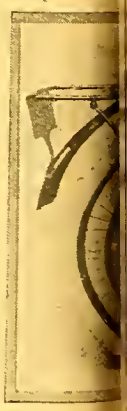
A neat coil spring device—the Brough.

However, recent patent files have revealed that several well-known concerns are experimenting with coil springs, while even in the car field their advantages appear to have been better appreciated of late. In this connection it is interesting to note that the post-war Douglas light car embodies them.

To secure comfort for the rider, designers have divided the springing problem into four classes, exclusive of the springing of the front wheel. First, the sprung saddle and rigid frame, which is just one degree of development from the pedal cycle. Second, a sprung sub-frame carrying the entire weight of the rider, as the Bat and Edmund devices. Third, the sprung frame designed to absorb the worst of the road shocks, and still retaining the sprung saddle. Fourth, a completely sprung machine, after the manner of the car, which does not need

The

The Brampto



The Swan
quarter

PRING FRAMES

ING DEVICES ON CHINES.

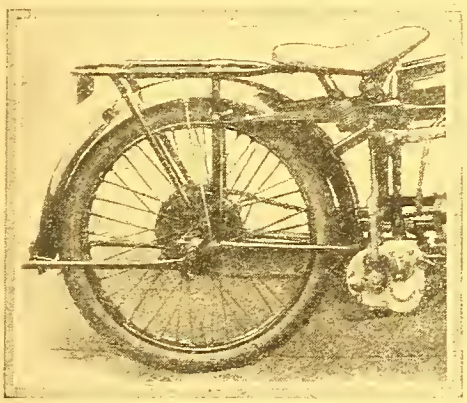
rame

a spring saddle, as the T.A.C. Incidentally, the T.A.C. is the most comfortable machine that I have tried. A fifth class may be made of devices using pneumatic cushions or pumps as the A.S.L.

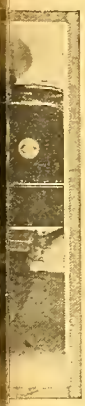
Without doubt the greatest difficulty to be overcome in springing a motor cycle is the tendency to lateral movement. To appreciate this, one had only to watch the rear wheel of any of the home-made three-wheel cycle cars which appeared on the road a few years ago. In fact, any three-wheeler with a single driving wheel in which leaf springs are used has this tendency, and the roll is more or less acute according to the methods of application of the springs and the workmanship.

To prevent this many designers have introduced devices which have been far from sightly, and, however great the advantages of such designs may be, their chances of success as commercial propositions are small. It has been said with some truth that a motor cyclist prefers an uncomfortable machine to an unsightly one, and this is a point which designers should bear in mind always. The tendency of the average designer is to go straight ahead to solve his problems without any considerations regarding appearance; but the unorthodox is

a Hobart.



The latest spring frame—the Raleigh.



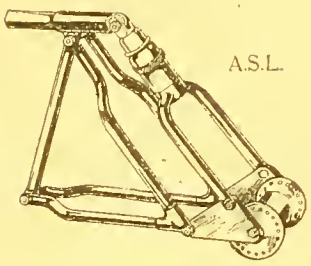
ing

not welcomed by this conservative nation, and anything that is radically different is usually regarded as a freak.

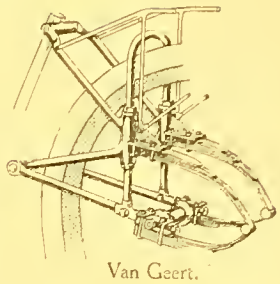
The Question of Appearance.

Some of the designs patented recently probably deserve criticism on this point, but it is encouraging to note that, taken generally, the machines fitted with spring frames which have been built are not unsightly. True, some are very strange looking, but some there are that have been enhanced in appearance by the introduction of springing devices, while, where coil springs are employed, very little difference has been made on this point.

The Raleigh and A.B.C. particularly are handsome machines. In both these

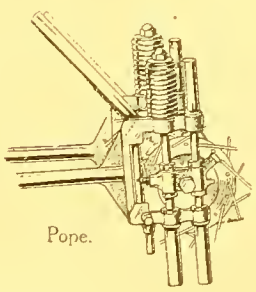


A.S.L.



Van Geert.

designs the disposition of the springs is similar to those on the Indian. Moreover, the Brough and the Brampton designs, employing coil springs, would pass unnoticed as departing from the appearance of the conventional rigid frame. On the other hand, the Matchless, like the American Pope design, gives the rear wheel a somewhat complicated appearance, while the Royal Ruby suffers even more in this respect. In the latter design the springing device appears cumbersome, and undoubtedly adds considerably to the weight and cost of the machine, but it should be remembered always that such points do not matter a great deal, provided the increased efficiency justifies them. Nevertheless the Royal Ruby design as shown here is not what motor cyclists would term good-looking, and here again, in fairness to the makers—in fact, to all makers—it should be borne in mind that most designs which in their experimental stages appear crude are capable of being refined when the inventors have proved to their satisfaction that they have secured the mechanical results at which they have aimed.

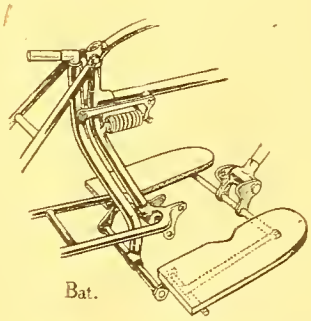


Pope.

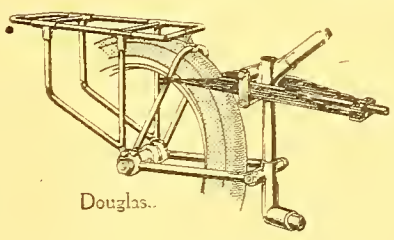
Neatness v. Efficiency.

The Swan is a neat springing device, but one which probably would produce side strains upon the pivot bearing of the back stays, as both springs and stays are very near the horizontal line of the hub. Here efficiency has been sacrificed to a certain extent in order to obtain neatness, which, in this case, is unnecessary.

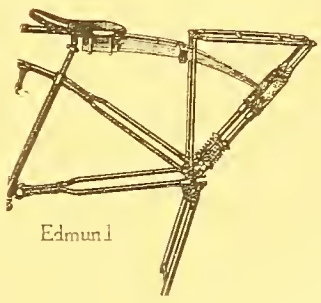
It is in the prevention of such strains as mentioned above that makes the springing of a single-track machine so



Bat.



Douglas.



Edmund

Spring Frame Machines.—

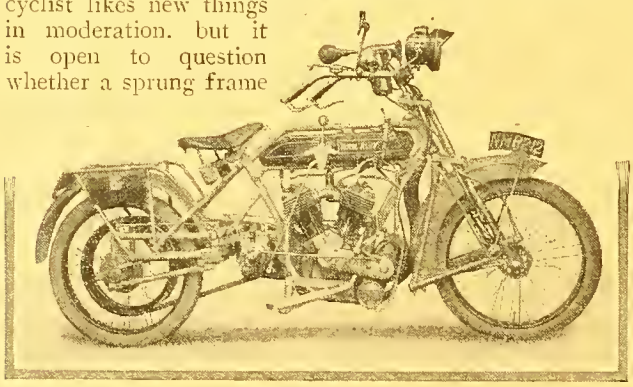
difficult. When the stays, which approximate to the torque rods on a car, and the springs are close together, the prevention of roll is more difficult than when the springs and torque members are far apart, as in the Indian. As an example of this one may cite the T.A.C. design, on which there are no torque rods, but by placing the springs well above and below the wheel centre the springs not only take the torque, but also maintain the wheel in an upright position. It is all a question of leverage, and the value of this may be appreciated when it is remembered that a sprung saddle is not necessary on the T.A.C., showing that the springs are sufficiently resilient to absorb all shocks.

The neatly sprung wheel of the Wooler.

The Whiting design is the invention of a Colonial motor cyclist who demonstrated his machine to several British manufacturers before the war. In this half-elliptic springs are used in a manner more or less following car lines. The springs are shackled at each end, the torque being taken by a sub-frame.

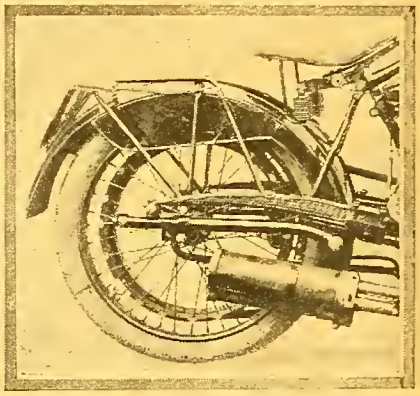
Probably the lack of accessibility is one of the greatest faults of this design, as the rear wheel is enclosed entirely by the framework.

In both the Royal Ruby and Whiting designs is revealed the inventors' total disregard of conventionality. Not content with introducing a sprung frame, the designers of these machines have gone "all the way" and applied their inventions to both wheels. It has been proved time after time that the British public hesitates before purchasing anything unorthodox, and the slow evolution of the motor cycle may be attributed to this more than anything else. The average motor cyclist likes new things in moderation, but it is open to question whether a sprung frame machine, with four-speed countershaft gear box, all chain drive, dynamo lighting set, etc., etc., would have "caught on" if introduced to the market when single-speed machines were fashionable, and only the introduction of a clutch was demanded by the rider.



A Royal Ruby experimental machine with quarter-elliptic leaf springs at both wheels.

Ten years hence ten speeds and an entirely different type of machine may be accepted practice, but, to-day, such a machine would be regarded as a freak. I have before me the patent specification of a wonderful machine which if introduced would be regarded as a joke, yet a few years hence may be acknowledged as the ideal. One has only to take one's mind back a few years to recall several machines embodying a large number of apparently valuable features. These machines were, almost invariably, years before their time, and through the breakdown of one feature all the others have been discarded.

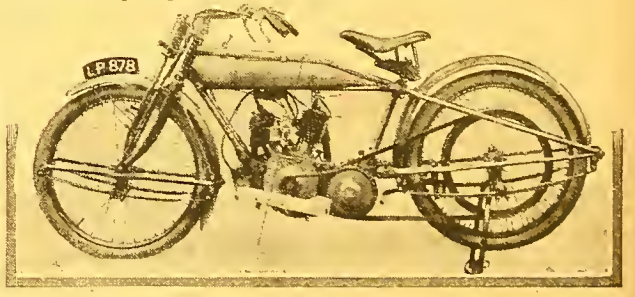


The Zenith design with leaf springs.

Gradual development on sound lines will prove to be the best in the long run, and there can be no better illustration of this than in the various restrictions placed upon us from time to time during the war. Had all these come about in 1914 the nation would have been up in arms against them.

From these lessons it would seem that it behoves the inventor and designer to proceed cautiously, remembering that a pinch of salt enhances the flavour of a dish, whereas a handful will spoil it.

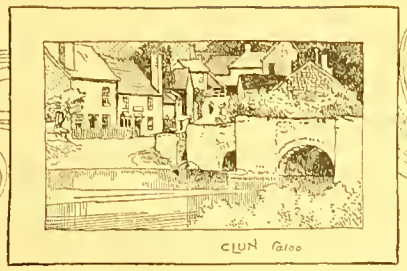
However, this is by the way. The evolution of the spring frame appears to be going on in a satisfactory manner, and very few designs come into the "freak" category. Every credit is due to those who have led the way and experimented, as in the motor cycle industry, perhaps more than in any other, the pioneer usually spends a great deal of money for the benefit of everyone and sometimes reaps little reward himself. In spring frames, however, the designer of an efficient and sightly device is promised success commercially, as of all the demands made by the riders of to-day that for spring frames is the most insistent.



The Whiting—a Colonial design embodying half-elliptic springs at both wheels.

Long before the war the increased speed and weight of motor cycles made manifest the fact that spring frames would be found necessary. Add to these factors the deteriorated condition of the roads in this country and the requirements of riders in the Colonies, and the designers cannot fail to appreciate the need for such devices.

VEDETTE.



THE "PEACE" MODEL.

A Review of Current Rumour and Fact.

Apart from any question of the early cessation of hostilities, a review of post-war models is a matter of interest to rider and maker alike. In submitting his commentary our contributor betrays no confidences. He deals with the matter as viewed by a man in trade circles who has watched closely the patent files and tendencies in the trade as revealed by news paragraphs which have appeared from time to time in these pages.

THE great alteration in the military situation permits a degree of optimism which a few months ago might have appeared ridiculous. Post-war prospects and peace model specifications have now a place in the managerial discussions of our motor cycle factories. Very few large and new contracts are expected by those who have been "all out" on John Bull's orders. Soon it may be possible to divert a certain amount of labour to start again to build up the world instead of destroying it.

So normal productions come to the maker's mind. He remembers that before the war he was a maker of motor cycles, and he realises that it is the business he understands best. He must call a consultation. Yes, that is the first step—a consultation with the designers, the works manager, the sales department, the financial expert. But where are they? Where are the men who were allied with the production of pre-war models? He ticks them off on his fingers. The works manager, an ardent motor cyclist? He accepted a commission and a "job" on the Air Board. The designers? Only the tracer is left—the others have gone to car firms or the R.A.F.—they are all over the country. The sales manager? He joined the A.S.C., M.T.—and so it goes on. He has not the same organisation which had built up the reputation of his firm.

Some Probable New Models.

Such is the position of several makers. What will they do? There is only one thing they can do if they are to share the trade that will follow immediately upon the cessation of hostilities. Many a maker, small and large, will be compelled to recommence where he left off to take up his war work, and reintroduce his 1914 and 1915 models with those minor improvements which he had in his mind at that date.

The question arises as to whether the public will be disappointed. I think not, and there are many who will share my views. On the other hand, there are many others who will consider that this is a retrograde step. But can we expect more?

There will be new models, of course, but because some firms have been able to produce experimental machines during the war, we must not regard the others as having been asleep. Every motor cycle concern has not had the opportunity to experiment. Firms have given their all to the nation's need, and they must not be condemned as having been apathetic to the interests of the motor cycle industry. Some firms have been able to keep their motor cycle department going, but there are many who have not.

Certain it is, therefore, among peace models there will be several old favourites with minor improvements, and had the war not come along we should have had them in 1915 and 1916.

Next there will be some of those models which have been described in the press during the war, but which have not been marketed extensively. Among these one recalls the Allon twin two-stroke, the Scott Sociable, the Rudge big twin, the P. and M. 90° twin, the Premier two-cylinder two-stroke, the Brough 5-6 h.p. flat twin, the Humber water-cooled flat twin, the Rex shaft-driven machine, and the Levis opposed twin two-stroke.

Dark Horses.

Some of these may not appear on the market. As a matter of fact, I have knowledge that some already have been abandoned, but undoubtedly there are many which have passed the experimental stage and will be marketed when the necessary jigs and tools have been prepared.

There are other models of which little has been heard, but which are known to exist. Among these may be mentioned the new 8 h.p. Sunbeam, the 8 h.p. Enfield, the 8 h.p. Clyno, the Raleigh flat twin, two four-cylinder propositions, a V twin two-stroke, and the new Sun-Vitesse.

In the next group are the rumours—rumours confirmed by the patent files in several cases—a Villiers engine with magneto flywheel, at least three improved flat twins by well-known firms, two three-wheel runabouts by concerns just as famous; and, if we go into the runabout class, there is also the little machine promised by Mr. Norton. In the rumour class there also are a further two four-cylinder machines, a friction-driven model, and a Ford type lightweight to sell at a popular figure.

But where are the wonderful entirely new machines which some would have us believe are due to us? Do they exist? If we examine the "trade," go through the list of makers, conjecture, rumour, knowledge, and commonsense, we find the likely channels very few indeed.

One naturally expects that the firms who have been able to "carry on" would be able to introduce something of a startling nature—if it were possible for any firm to do this at all. We have only to think of the machines which have been used by the Allied Govern-

The "Peace" Model.—

ments to know the names of the firms to whom the motor cycle is still the normal article of production.

The Triumph? If the patent files are a fair indication regarding the trend of forthcoming events, then we may expect a 4 h.p. Triumph with all-chain drive, a new gear box with an efficient shock absorber. There is nothing very startling about that, but readers of *The Motor Cycle* know the solid reputation of this firm, and, if the peace model Triumph is not of such a revolutionary character as might be expected, they will know that, in all probability, every part of the new model has been thoroughly tried out and adopted only after the most thorough experiment.

The B.S.A.? This is one of the few concerns around which no startling rumours float. There *are* rumours, of course, but one may assume that they concern additional models rather than an entirely new machine to take the place of the existing B.S.A., which has given good service under the most severe war conditions.

New Twins.

The Douglas? There are more rumours of a new 3½ h.p. flat engine of interesting design, and the patent files tell us that experiments and certain decisions have been arrived at in connection with spring frames employing coil springs. On the whole we may expect a real peace model from the Bristol firm, but, even if it does not fructify, we must remember that an improved pre-war model must owe its improvements to service such that ordinary riders could not have given it. Therefore, it is reasonable to expect a peace model Douglas which is in every way up to the times.

The Enfield? Here, again, the patent files reveal an interest in spring frames, and it is fairly common knowledge that the engine of the sidecar machine will be increased to 8 h.p. Whether the old two-speed gear will be retained or a three-speed box of the more general type embodied is an open question.

The Clyno? The makers of this machine are never far behind, and, as it is advertised that the engine will be 8 h.p., we may expect a new machine embodying all it would have done had there been no war. There are rumours, also, but it is perhaps unfair to quote them in this case. In any event it appears to be common knowledge that the Clyno Engineering Co. is one of the few firms which has been able to experiment, and we must await the results with patience.

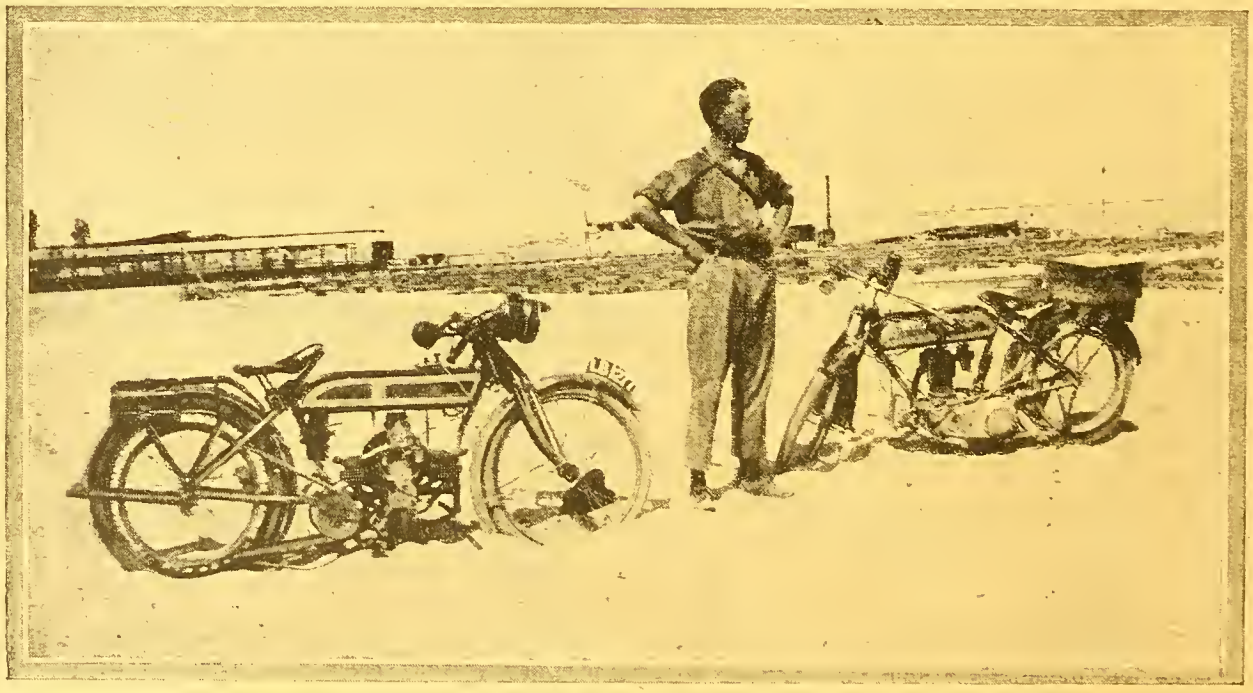
The Influence of Aero Design.

The A.B.C.? One naturally expects a great deal from the makers of the A.B.C. Since the war we have described a diminutive flat twin and a larger sister which developed enormous power at a very low weight. Frequently it is spoken of as being the nucleus of the 6 cwt. light car of the future. It remains to be seen whether we shall have a featherweight machine for sidecar work, to take the same place among passenger machines as the 3½ h.p. for solo work.

Arrangements are being made for "quantity production," and this fact is announced in the advertisements. Hitherto this speedman's mount *de luxe* has not been within the reach of the majority of motor cyclists, and the formation of a company to exploit it is one of the most interesting news items of the times.

The P. and M.? Messrs. Phelon and Moore's 90° twin has already been mentioned, and its performance in the peace trials will be closely watched. It is the only 90° twin motor cycle produced by a well-known firm, and its many interesting features, combined with the superior balance of the 90° type, make it the most interesting V twin on the market.

But where are the machines with modified aeroplane engines—new systems of frame construction, and other unorthodox items of specification? SPES.



A despatch rider in the neighbourhood of the Suez Canal. The Douglas did not need a stand to hold it upright in the soft yielding sand.

THE ECONOMICAL MOTOR CYCLE.

A Study of its Effect on the Cost of Living from Actual Concrete Cases.

THE motor cycle's many advantages which appeal to personal enjoyment, such as speed, fresh air, and the joy of travel, have been in the past apt to obscure the more practical advantages of money and time saving. The present day of restrictions galore has emphasised the economical side of motor cycling in a very marked way, and every rider with a machine laid up is painfully aware of what he could save but for "that Petrol Control Department." Nevertheless, there can be no harm done in setting out some instances of expenditure and waste of time which might have been reduced to a mere trifle by the use of a small amount of petrol or petrol substitute.

The Man on Leave.

A relative of the writer on leave from France was due to report at 6 a.m. at Victoria on his return. The latest possible connection was at 12.45 a.m.—some two hours after trams had ceased running—and the distance to the station was just four miles. No taxicab could be obtained nearer than three miles, and it was necessary to pay for the journey out from the garage; this, with the return journey to and from the station, made a total of eleven miles. The fare, waiting, and tip amounted to 15s. 6d. A motor cycle and sidecar was at hand, but as it had been laid up for nearly twelve months no licence had been taken out, and it was not deemed advisable to risk a prosecution. Had it been legally possible, the running costs of the return journey of eight miles would have been less than one shilling—a clear saving of 14s. 6d. in less than one hour: almost enough to buy a War Savings Certificate. Incidentally, the petrol restrictions were responsible for this needless expense, although the journey would not have been illegal if the owner had had a petrol permit.

Moving House.

Even in these days of housing difficulties moving house is not an unusual experience, but the cost of the operation is most unusual. Furniture removers, like all other tradesmen, are short of men, and those employed are frequently not expert packers, to say the least of it. In the case in point it was considered advisable to arrange for the separate removal of certain delicate and valuable articles of small bulk, including china, glass, and books, rather than leave them to the tender mercies of the van man. The cost of hiring a small motor lorry for the journey to the new house and the necessary careful packing in wooden boxes totalled a little over £2. The distance was between five and six miles. A sidecar outfit might have been utilised for, say, ten journeys, total one hundred miles, on one and a half gallons of petrol, at a cost of 6s. —a saving of £1 14s., and with less risk of damage to the articles, as each load would have had the owner's personal attention.

The Housing Difficulty.

Another illustration demonstrates not merely the economy of the motor cycle, but also the abnormal expense to which many persons are put by reason of the petrol restrictions. A motor cyclist obtained a position on work of national importance in a certain Midland city where housing difficulties amount almost to a scandal. He was quite unable to obtain a house within reasonable reach of his work, and was perforce obliged to put up with expensive lodgings for himself, whilst keeping on his house at home nearly one hundred miles away. Later a house was offered to him at a certain Midland river resort only eighteen miles from his office, but which by reason of an extremely bad railway service was an impossible proposition. The morning journey on the present time-table takes from 9 a.m. to 12.15 p.m. Think of it—three and a quarter hours to cover twenty-two miles by rail! Some men could walk the distance almost as quickly. The evening return journey by rail would occupy two and a half hours, and home would not be reached until 8.30 p.m.

This is where the motor cycle would score. Eighteen miles a day each way on good roads can be covered in about an hour and a half for the double journey—a saving of four and a quarter hours. Many machines would run the return journey three times (108 miles) on a gallon of petrol, and the journey need only be made five days a week (work at home on Saturdays being permitted). Two gallons per week is all that is necessary. The comparative outlays are as follow:

Present Conditions.		Circumstances Depending on Use of Motor Cycle.	
Cost of board residence per week	£2 10 0	Estimated cost for keeping the house offered, which is smaller and rates are much lower (includes self and family)	£4 10 0
Estimated cost of keeping home running for family	£5 0 0	Road travel per week, two gallons of petrol, say 7/-	7 0
		Running costs	3 0
		Mid-day lunch away from house five days	10 0
	£7 10 0		£5 10 0

A saving of £2 per week, plus comforts of home life.

The costs given here are based on actual facts without exaggeration in any way, and, whilst their chief point lies in demonstrating the economical method of travelling afforded by the motor cycle, they also show instances, typical of others, in which business men and workers are put to continuous expenditure of time and money by reason of the withholding of reasonable grants of petrol. F.A.S.

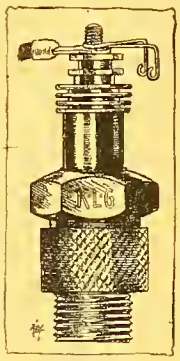
COMPARATIVE CASES.

	£ s. d.		£ s. d.
(1) Taxi journey	0 15 6	Motor cycle	0 1 0
(2) Hire of motor lorry	2 0 0	„	0 6 0
(3) Weekly cost of living without grant of petrol	7 10 0	Same with two gallons of petrol per week	5 10 0

K.L.G. PLUGS.

Plugs with an Exceptional Reputation designed by a Well-known Racing Motorist.

MANY motorists who, in the old days of peace, used to journey down one of the most popular main roads out of London during week-ends, may remember a picturesque-looking old house on the left, standing by itself just at the end of a very famous police trap. This building is some three hundred years old, and contains a secret passage which used to run to one of Charles the Second's hunting boxes. Later in its history, when a coaching inn, this hostel was the haunt of Jerry Abershaw, the highwayman, who is reputed to have been hanged on an oak tree in the garden. This house is interesting to modern motorists in that it is now used as the offices of the company manufacturing K.L.G. plugs.



The K.L.G. plug with patent spring terminal.

These plugs were in a fair way to becoming famous in 1914, as they were among the best of their kind on the market and eminently suitable for high-powered racing cars. That well-known racing motorist, Mr. Kenneth Lee-Guinness, finding great difficulty in discovering a plug which would stand up to the excessive temperatures found in a powerful racing car engine, was led to give the matter of plug design very careful attention, with the result that he succeeded in manufacturing for himself a highly-finished and well-made sparking plug on which he, and later other racing motorists, won many successes, among which we may mention the twelve hours' record, the chief Sunbeam records, and Hornsted's many acts of prowess on Brooklands.

The Demands of the Army and Navy.

Being of high quality and being manufactured in small quantities, the price was likewise high, and in 1914 K.L.G. plugs were sold at 10s. 6d. each, and that is probably why they had not become known among motor cyclists. Naturally, as soon as war broke out the demand for high-class plugs became unprecedented, and plugs which would stand up to the excessive demands of aero and tank engines or engines used in coastal motor boats were greatly needed. This led to the factory growing to quite considerable proportions, and after the war special K.L.G. motor cycle plugs, suitable for two-strokes and other engines prone to plug trouble, will be placed on the market, and, thanks to the increased output, will be sold at a moderate figure by the makers, the Robin Hood Engineering Company, Ltd., Newlands, Putney Vale, London, S.W.15, whose factory now employs numerous hands, occupies considerable space, and is steadily growing.

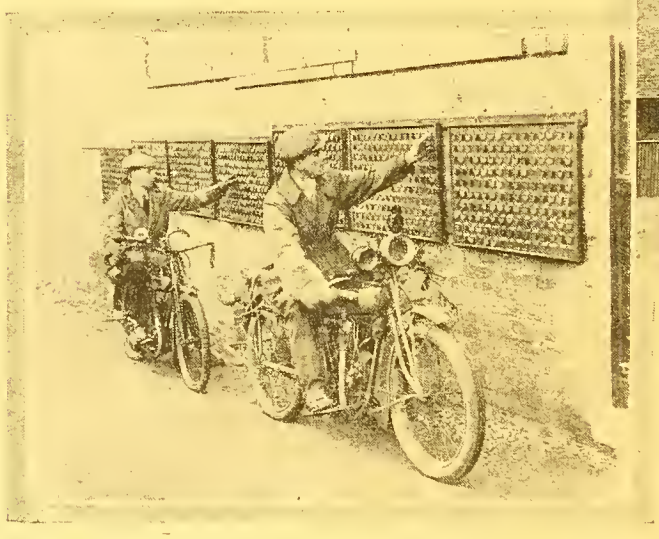
Mica Insulation and a New Terminal.

So far as the plug itself is concerned, it is a very highly finished article, and, unlike most of the popular plugs in use at the present time, it has a mica insulation. The electrodes are exceedingly substantial, and a great feature of these plugs is their ready detachability for cleaning purposes. Unfortunately, we are not able to say more about the internal design at the moment.

It is interesting to note that each plug is supplied without a terminal screw, and in its stead is to be found a small spring clip which is slipped over the threaded portion of the central electrodes after the ordinary cable terminal has been placed in position. This clip has the advantage of holding the terminal as firmly as the ordinary screw, of being instantly attachable and detachable.

The principal feature is the successful method of ensuring perfect insulation at all temperatures—the weak point in mica plugs being the failure of the adhesive between the mica layers.

Newlands, the highwayman's resort, on one of the main roads out of London.



Motor cyclists checking out of the works at the beginning of the lunch interval.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

HANDLE-BARS.

Sir,—I have been an enthusiastic motor cyclist since 1909, but I always rode machines fitted with touring bars. However, I was continually coming across letters in *The Motor Cycle* stating that semi-T.T. bars were streets ahead of any touring bars for comfort, and in 1916 I purchased a 5 h.p. machine with semi-T.T. bars, and was disagreeably surprised to find how my wrists ached after a long ride. Early in 1917 I managed to get my bars exchanged for the touring pattern, and enjoyed real comfort once more.

The semi-T.T. bars may save backache on a long ride, but the ache is transferred to the wrists. The majority of one's riding is done in short trips (under sixty miles), and here the touring bars, to my mind, are infinitely more comfortable. The Indian type of touring bar is the best I have come across, and is adjustable to the taste of the owner. I have no connection with the firm producing this machine. Footboards I find streets ahead of footrests for comfort, and consider a quickly detachable wheel, *à la* A.J.S., Sunbeam, Model H Matchless, etc., a necessity for Colonial models to facilitate changing inner tubes. BESQUAND.

AN IDEAL MOTOR CYCLE.

Sir,—I have not ventured to worry you before, but I have noticed lately a lot of correspondence in your columns as to the ideal machine. I should like to say a word on behalf of a machine which is as near perfection as I ever expect to find, and I am of the opinion that a more perfect machine would be very dull to drive.

I refer to the 4 h.p. A.J.S. I bought one of these machines second-hand in 1916, and have managed to squeeze 2,000 miles out of it, though out here the whole time, during short leaves and a couple of months at home after a slight wound. With this machine I can take a heavy sidecar, hood, screen, spare wheel, passenger, and luggage over any main road. I have climbed various lanes in the Isle of Wight which are not meant for motor traffic. It will do 48 m.p.h. with loaded sidecar, and I have got 52 m.p.h. solo by Cowey speedometer. This may be optimistic, but I am not a speed merchant by nature. It does 80 m.p.g. with sidecar, starts first kick every time, is as comfortable as possible, with big tyres and a spring seat-pillar, entirely reliable and willing, and my only grouse is that it is somewhat monotonous to drive, as I do miles on end touching only the throttle lever. It will be indeed a good machine that will tempt me to sell this one.

Needless to say, I have no interest in the A.J.S. firm.

B.E.F. MAJOR, R.G.A.

Sir,—I have seen many controversies in your journal about ideal machines. I think that the ideal machine should have the following specifications:

Engine.—600 c.c., 5 h.p., horizontal opposed twin, overhead valves, detachable cylinder heads, streamlined radiating fins, large roller bearings in big end and crankshaft, internal and external flywheels to ensure smooth running.

Lubrication.—Forced system after the style of the American Excelsior, auxiliary hand pump embodied in tank.

Magneto.—Good, reliable English magneto placed on top of the crank case, with large angle of variation.

Carburetter.—Schebler system, with English controls on handle-bars.

Gear Box and Transmission.—Four-speed gear box after the style of the Jardine gear box, with kick-starter embodied, provided with automatic exhaust lifter after 1919 American Excelsior style; gear ratios, 4½ to 1, 5½ to 1, 7 to 1, and 10 to 1.

Transmission.—⅝in. × ⅜in. enclosed chain, with oil bath after Sunbeam fashion, shock absorber embodied.

Wheels.—28in. × 3in. interchangeable with knock out axles, and large scope for adjusting alignment and chain tension; resembling the Indian.

Brakes.—External contracting.

Frame.—Straight bar, duplex spring frame, and cantilever system of springing.

Front Forks.—Druid, or quarter-elliptic.

Tank.—To hold two gallons of petrol and one quart of oil, fitted with large filler caps.

Controls of the English lever type; gear gate change on right-hand side of the tank, and ignition lever on left-hand side.

Accessories.—Dynamo lighting outfit and speedometer.

I claim that a machine like this would contain the advantages of both American and English machines. The only disadvantage is that it would cost about £80; but I am sure that the majority of people would prefer a machine of sound reliability to the 7-9 h.p. American machines. As far as I can see, the Brough 5 h.p. machine is the nearest approach to this. This machine would be able to attain a speed of 70 m.p.h., which is quite as much as the average American machine will do on the road. Why cannot some of our manufacturers fit such things as mechanical oil pumps? I am afraid the average English manufacturer is a little too conservative, though undoubtedly he turns out the most reliable machine in the world. R.N.

BRITISH AND AMERICAN SIDECAR MODELS.

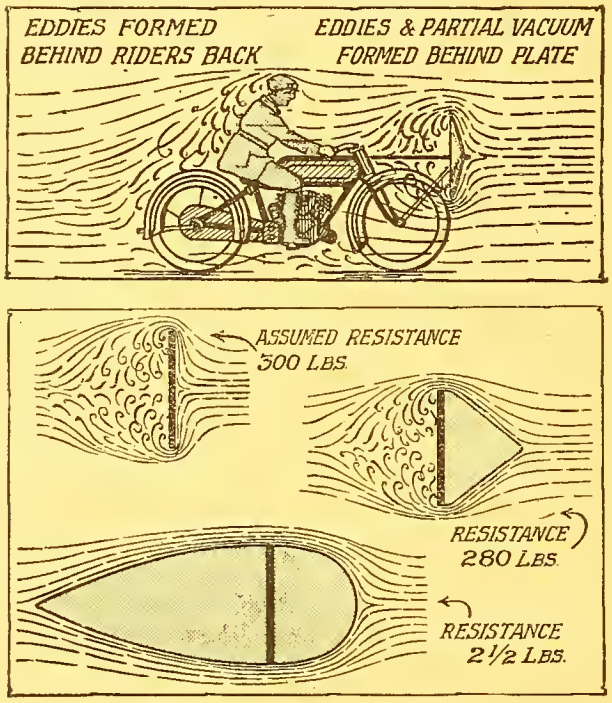
Sir,—In regard to the articles on sidecar design which have appeared in your pages during the last year or two, and as I am contemplating the purchase (after the war) of a powerful sidecar machine, I have been making exhaustive enquiries as to the power and weight of British sidecar combinations in comparison with those of American build. From what I can gather by correspondence with the makers of British-made machines, there is not one of them who will guarantee to provide a machine built throughout in their own factory, and solely made of British materials, that will compare with the best American sidecar models so far as horse-power is concerned. Of course, I am aware that the American firms have had a much better opportunity of perfecting their models than their British *confrères*, who have been almost-solely engaged on munitions of war; nevertheless, while there is a demand for a very powerful sidecar model, it seems a pity that no British manufacturer is prepared to give particulars or quote for such a machine in competition with American products.

Naturally, I am aware that the latest American models can no more be imported into this country at the present time than the British manufacturers can supply post-war models of their products, but I feel sure that there are others like myself who want a very powerful machine to carry three or four passengers, including the driver, who will turn their attention after the war to the American models in preference to the British unless some of the home manufacturers are alive to the conditions and supply what is demanded.

Personally, I would not buy an assembled machine, and if I cannot obtain one built throughout, including the engine, in one British factory, I shall purchase an American model at the earliest opportunity. SPORTING TOURIST.

STREAMLINING.

Sir,—In your issue of October 3rd I notice that M. Boursiac proposes "streamlining" a cycle car or motor cycle by the fitting of a cone to the front of a machine. He also cites the instance of a light car whose efficiency was increased 20% by the fitting of an aluminium cone, and "that a plain flat disc gave better results." Has M. Boursiac a knowledge of the fundamental principles of streamlining? If so, he will at once see that his suggestion is useless. The object of streamlining is not so much to reduce head resistance as to minimise the resistance caused by eddies and partial vacuum formed by a flat surface passing through the air at speed. The only method of minimising the resistance created would be either to enclose the rider and machine in a streamline casing or to attach a streamline form to the rider's back, which was once done with tolerably good results. This, however, is not practicable except for the track. Enclosed is a sketch showing the inevitable result of M. Boursiac's suggestion—namely, an increased rather than minimised resistance.


EDDIES FORMED BEHIND RIDERS BACK
EDDIES & PARTIAL VACUUM FORMED BEHIND PLATE
ASSUMED RESISTANCE 500 LBS.
RESISTANCE 280 LBS.
RESISTANCE 2½ LBS.

Varying resistances of partial and total streamlining.

Your readers will agree that a cursory glance at aero practice will verify this, as here we have streamlining at its best. Perhaps some of them will voice their opinions on this matter. Wishing your paper every success,

A BUDDING PILOT R.A.F.

THE COMING CYCLE CAR.

Sir,—The comments by "Ixion" in *The Motor Cycle* for October 24th respecting the future of the cycle car are being read with intense interest by a far greater circle of motor cyclists than even that seasoned critic might be supposed to hope for. Undoubtedly he has not lost sight of the fact that a great many manufacturers are steadily experimenting to produce a true cycle car which can at last be described as an engineering job and a sound proposition in comparison with many former models.

There are also hundreds of people whom we may call "dabblers" who are preparing more or less wild cat schemes for satisfying the insatiable craving of the weather-beaten motor cyclist for something of a comely appearance on four wheels, in which he can stow himself and his encumbrances in the enjoyment of greater comfort than the previous makeshifts could afford, coupled with equal reliability and ease of handling. Those who babble of chassis fashioned after the fuselage of an aeroplane in conjunction with multi-cylinder engines of the rotary type must surely be merely qualifying for Bedlam. Apart from the cost of such an engine, the fuselage of an aeroplane is certainly not suited to the different kind of shocks and stresses handed out by a lumpy road, as compared with the more or less cushioned ones occasioned by the gyrations of flying.

In the meanwhile, "Ixion" is invited to contemplate as serenely as possible the startling project of supplying an eager public with a four-wheeler, complete with mechanical starter, electric lighting, and two speeds with reverse, not to mention other refinements, whilst the price will be the post-war equivalent of 100 guineas—whatever that may be. This proposition has passed through the drawing office stage, and the experimental era is merely confined to certain brutal tests to ascertain whether the dimensions of certain parts are up to the task of withstanding the sort of usage that I—as an experienced cycle carist—know will be forthcoming. When this is finished, I propose to sit down and wait for some manufacturer to finish messing about with bits of ironmongery in a remote corner of his works and come to me to talk business.

Anyone can build a cycle car of a sort; but it is the finding of the right lines to work upon that has caused all the trouble over this cycle car business hitherto, and has resulted in the production of some of the most abominable contraptions that ever rolled spasmodically along a road.

A. G. FENN.

THE MIXED TURBINE.

Sir,—The article on "The Mixed Turbine" in your issue of September 19th interests me greatly. I have been working on similar lines for some time, and the point which has so far baffled me is one which, it seems to me, appears in the design of G.H.P.

It is this. As soon as pressure rises in the generator, apparently fuel, air, and water would be driven back in their respective feed pipes, and, incidentally, the flame would be extinguished. To avoid this, the pressure on all three feeds would have to be greater than the pressure in the generator, which, in order to produce the h.p. required, would be, it seems to me, very high.

I am only an enthusiastic amateur, so advance this view with diffidence, and should be very glad of expert opinion proving me wrong.

JOHN HARPER.

BRITISH AND AMERICAN MACHINES.

Sir,—Among your readers there must be many thousands of riders of American machines; and though such letters as Mr. Coath's may amuse them, they make them tired. If Mr. Coath will be a little less vague, and tell us what parts do fall off the spring frame machines, he will be doing a service to a lot of riders who might have lost parts and not missed them.

And why should the Harley-Davidson factory, for instance, have a British machine in a glass case in their factory? American factories are not museums, but live go-ahead workshops.

Mr. Coath reminds me of the legend of the farmer at the Zoo: He would gaze a long time at a Henderson, and then remark that there *aint no such thing*.

Anyhow, the great majority of riders of American machines are men with many years of motoring behind them, and they know.

P. WHALE.

TANGENTS OF OBSERVATION.

Sir,—The rough and ready formula given me years ago by a shipmate for distances visible over the (alleged) perfect plane of the sea is that the square root of the height in feet above the sea level gives the answer in miles, and for average refraction one-thirteenth of the result should be added.

$D = \sqrt{H} + \frac{\sqrt{H}}{13}$ when D equals distance in miles, and H height in feet above sea level. Take Snowdon as a little over 3,000 feet (exact data are not to hand), the result would be about fifty-five miles plus four miles for refraction—that is to say, on a very clear day one should be able to see Snowdon from sea level fifty-nine miles away.

Again, the peak of Teneriffe is about 12,000 feet above sea level, and with this formula should be visible about 116 miles. I believe it has occasionally been seen from a distance of 100 miles or so, and, of course, anything which shows up above the horizon sufficiently far to be recognised is not at the theoretical limit of vision.

PAILLE.

Algeria.

A WATERPROOF SADDLE TOP.

A Substitute for Leather in the Manufacture of Saddles.

THERE is an old saw which reads, "There is nothing like leather." The quotation is true up to a certain point, but so far as motor cycle and cycle saddle tops are concerned James Jelley's Flexo waterproof saddle top looks like not only being a substitute for hides, but an admirable article for the purpose.

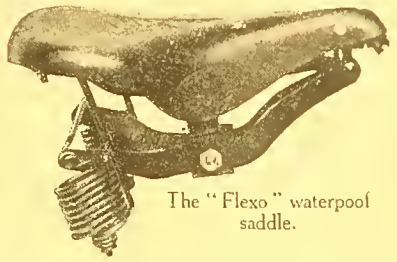
Mr. James Jelley, a director of the Micrometer Engineering Co., Ltd., Spon Street, Coventry, has been at work for upwards of two years on the waterproof saddle which we illustrate. In a photograph there is nothing to denote that the saddle differs in appearance from those to which we are accustomed, but examination of the article itself shows that the top is made of a patent material which resembles a mixture of stout rubber and canvas.

Blocking the Tops.

We have examined numerous samples of this patent saddle top, and can vouch for the shape being equal to anything we have yet seen in saddle making. In other words, the blocking of the top, to provide a narrow front, nicely shaped sides and peak is equal to the best leather tops produced. Naturally the high price of the best hides from which saddles are produced caused the patentee to think about substitutes, and the Flexo top is the result of his efforts. Obviously the early samples, which we have also seen, are not to be compared with the one illustrated, and many difficulties lay in the path of the success which has ultimately been attained.

As regards the flexibility of the patent material, we experimented with a strip 2ft. long, 2in. wide, and $\frac{3}{16}$in. thick, and found that by exerting considerable force it could be stretched for over $\frac{1}{4}$in. This proves that it is as stretchable as leather, but, unlike the latter, resumes the original length when released.

Every motor cyclist knows that in wet weather he must keep the saddle top dry, *i.e.*, if he wishes to ride in comfort and



The "Flexo" waterpoof saddle.

prevent the leather top from sagging with the wet. The Flexo top can be left out in the rain for an indefinite period without suffering in any way from moisture; also, this waterproof quality assists it to retain its shape.

Unaffected by Wet.

Examples have been in use by cyclists for some thousands of miles, with excellent results, and, contrary to what one might expect from the nature of the material, it does not cause any heating of the body; neither will perspiration affect the material any more than rain. Altogether we were very favourably impressed with the new tops.

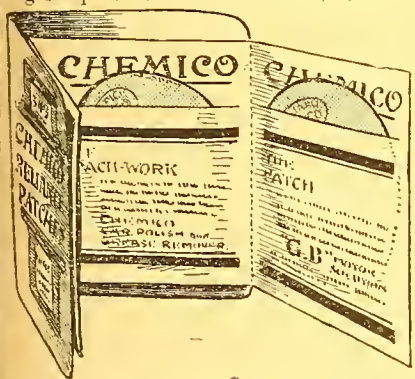
Manufacturing Arrangements.

Incidentally, we may mention that it is the intention of the patentee and others to form a company to make the saddles complete, to be located probably in Coventry. The manufacture of the material will provide a new industry for the city, and as cost of manufacture compares most favourably with leather, there is every reason to believe that the manufacture of these tops will meet with considerable success. At the moment the patentee is not prepared to supply either saddle tops or complete saddles, as the arrangements for manufacture are not concluded; but as soon as the necessary preliminary negotiations are effected the company will be ready to enter into correspondence with riders and manufacturers concerning both retail and wholesale supply.

The construction of the tops has been patented in Great Britain and practically all over the world where letters patent can be obtained, and we shall be surprised if these substitute tops do not cause a considerable stir throughout the pastime and trade when exploitation commences in earnest.

CARRYING PATCHES.

TYRE patches are awkward things to carry about, but they are often badly wanted, and it is sometimes difficult to store an extra one in the repair tool-kit. The County Chemical Co., Ltd., Chemico Works, Bradford Street, Birmingham, has recently placed on the market an exceedingly neat folder carrying six patches in the sizes of 1, 2, and 3



The Chemico tyre patch carrier.

for the use of motor cyclists. The patches themselves are well known to our readers as being reliable and excellent media for repairing punctures, but the novel method of carrying them in such a manner that they take up practically no room in the motor cyclist's pocket is particularly commendable.

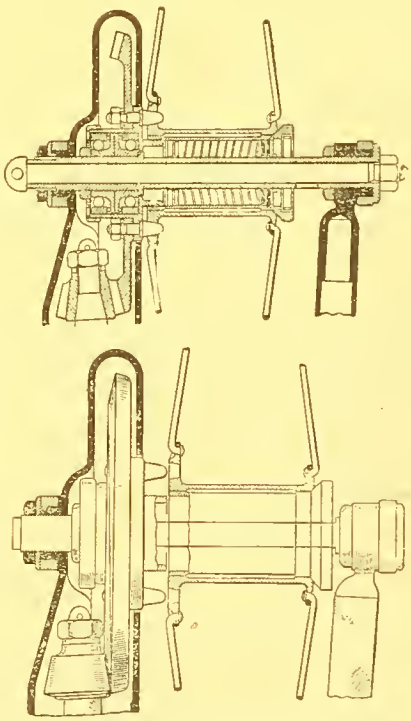
A RALEIGH SHAFT DRIVE.

WE realise how fully the new Raleigh motor cycle department is alive to possible developments when we find this company including shaft transmission among its several patents. This, of course, is no indication that a shaft-driven Raleigh is in prospect as a model for the immediate future, and one cannot assume that such a transmission has been considered seriously in connection with their flat twin engine, as this type of engine is least suitable for shaft drive. Notwithstanding, it is so long since a new shaft drive machine appeared that the patent drawing is interesting as showing how such transmission would be applied in conjunction with a detachable and interchangeable wheel.

This invention differs slightly from the detachable wheel adopted for use with chain drive, and it will be seen from the illustrations that the bevel wheel is mounted on double ball bearings having thrust bearings between them.

This mounting is left standing when the wheel is removed, and here again the principle of detachment differs slightly. The hub shown in the illustrations is carried on roller bearings of the Hyatt type, greatly favoured by designers of American cars, the Ford included.

The first illustration is a sectional view of the hub and transmission bevels, while the second picture depicts the hub when the distance piece has been removed and the wheel moved laterally to allow of its withdrawal.



A shaft drive and quickly detachable wheel patented by Mr. Commery, of the Raleigh Cycle Co.

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Innocent Misrepresentation.

Having some time ago sold a combination for a 1917 model, which afterwards proved not to be correct, although sold to me under that description, I beg to ask your advice. The purchaser has sent a solicitor's letter demanding the money back. He has had the turnout since the Saturday following Whitsun week, and I received a letter to say it was in very good order.—E.D.

We are very much afraid that you have no alternative but to offer to take back the machine and refund the purchaser the money he paid for it, less a certain amount, which you should be able to agree between yourselves, as payment for the hire of it. On the other hand, you have actually the same course of action open to you against the man who sold the machine to you. If your purchaser takes the matter into court, we think it very improbable that a judge would demand that you refund the money and take the machine back without any compensation at all, as you should be able to prove that you sold the machine under the honest impression that it was a 1917 model; consequently, this is not a case of direct misrepresentation on your part.

Licences and Permits.

I am purchasing a 7-9 h.p. Indian combination, and should be glad of some information. (1.) Is the local taxation licence on motor cycles of higher than 3½ h.p. more than £1, and does the sidecar make any difference to the tax? (2.) How must I set about paying the local taxation licence? (3.) When I purchase the combination the present owner will transfer the registration number to me for 1s. Owing to present restrictions, I shall not be able to use the combination, and therefore, I understand, I am exempt from taking out a driving licence and also from paying the £1 tax. Should I inform the police of my purchase? (4.) Is it essential to dismantle the engine or take off the wheels as a proof of non-usage of machine?—H.V.J.

(1.) No; the local taxation licence for all powers with or without sidecar is £1. (2.) Apply at any post office. (3.) If you intend to purchase the machine now with a view to laying it up for the rest of the war you only need to have the registration number transferred to your name. No other tax or licence will be required provided you do not use the machine on any occasion whatsoever. (4.) No. The police need not be informed.

Mudshields.

Being a medical man in a country town, I have lately purchased a Douglas motor cycle to help me in my work, being a motorist of many years' standing. I wear a pair of Brooks's leggings, which I find most serviceable. They keep the leg and the upper part of the boot clean and dry, but I find the front part (toe, etc.) gets in a horrible mess and most unsightly. I am informed that there is an article on the market which is fixed to the footboards just to slip the front part of one's boot into. This is the very thing I require, but have been unable to find out the makers. Perhaps you can help me by giving the name of the manufacturer.—W.S.B.

As far as we are aware, the actual part to which you refer is only fitted to A.J.S. motor cycles, and is made by the makers of that machine. There are, however, several similar arrangements that might meet your requirements. For instance: The winged mudshield, price 18s. 6d.; the A1 roller blind mudscreen, 15s.; the B. and H. leg guards, 18s. 6d.; and the College mudshield, 17s. 6d. These are all pre-war prices. The College, by the way, was obtainable in a smaller size at 12s. in leather and 9s. 7d. in cloth. There was also on the market an overboot, which consisted of a large boot-shaped protection for the forepart of the feet only, that could be slipped easily on or off the rider's ordinary walking boots. Also the combined overboot and legging was very effective, and was intended to catch the mud and keep it off the rider's clothes. The overboots were priced at 5s. 9d.; the combined overboot and legging 25s., or wool-lined 30s. All of these goods were obtainable from the Service Co., Ltd., 292-293, High Holborn, W.C. Before sending any money, it would be well to ascertain from the Service Co. if they are able to supply at the present time; and if you care to ask them at the same time for a copy of their catalogue, you will obtain full illustrations of the articles in question.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Two-stroke Ignition Timing.

I have acted upon your instructions and set the piston on top of the stroke, with the spark lever fully retarded and points just breaking, but fail to see how, when I advance the lever, the engine will gain speed, as the points break earlier then, and would cause the explosion to occur when the piston is on the up stroke. I noticed immediately after I had done this, leaving the lever retarded when trying to start up on the stand, one explosion seemed to be on the up stroke, sending the wheel back until properly started up. Is this important or not? The machine will climb well now with lever slightly advanced. Is this correct?—W.T.O.

We think you have forgotten that there is a certain amount of "lag," as it is called, or delay in the explosion. In other words, it takes an appreciable amount of time for the spark to ignite the charge; so though retarding the spark causes the explosion to occur apparently before the piston has reached the top of the stroke, this is not really the case, and the full force of the explosion is not felt until the piston is in the correct position. It certainly looks as if you have been trying to start with the spark lever too far advanced. This, of course, you must not do.

RECOMMENDED ROUTES.

CROYDON TO ILFRACOMBE.—H.W.R.M.

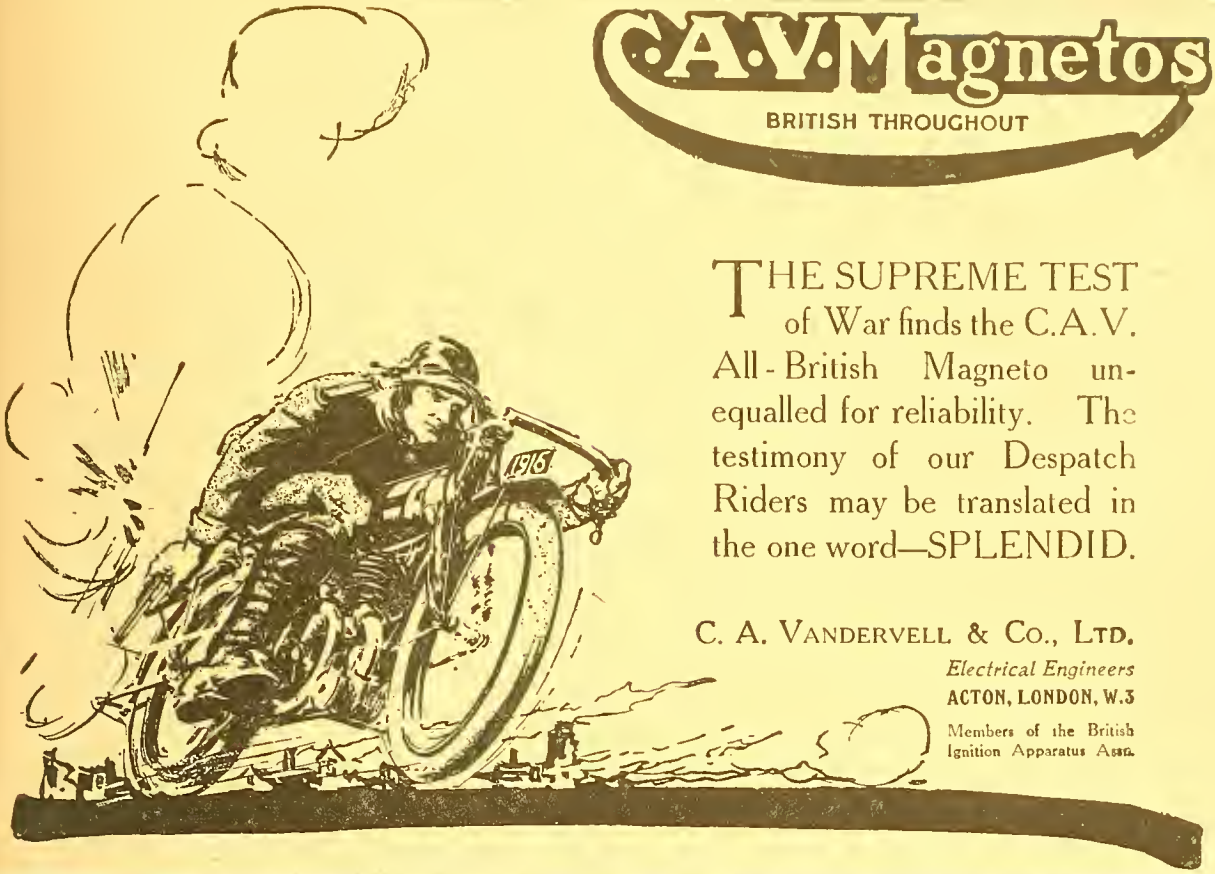
Croydon, Sutton, Surbiton, Staines, Virginia Water, Bagshot, Blackwater, Basingstoke, Whitchurch, Andover, Amesbury, Heytesbury, Bruton, Langport, Taunton, Milverton, Bampton, South Molton, Barnstaple, Ilfracombe.

CANTERBURY TO WINDERMERE.—M.J.

Canterbury, Charing, Maidstone, Wrotham, Meopham, Graveseud, by ferry to Tilbury, Brentwood, Ongar, Harlow, Bishop's Stortford, Chesterford, Cambridge, Huntingdon, to a point just north of Alconbury; here you join the Great North Road; follow this through Stilton, Stamford, Grantham, Newark, Retford, Doncaster, Ferrybridge, Aberford, Bramham, two miles north of which turn left and go through Harewood, Ilkley, Otley, Skipton, Settle, Kirkby Lonsdale, Kendal, Windermere.

C.A.V. Magnetos

BRITISH THROUGHOUT



THE SUPREME TEST of War finds the C.A.V. All-British Magneto unequalled for reliability. The testimony of our Despatch Riders may be translated in the one word—SPLENDID.

C. A. VANDERVELL & CO., LTD.
Electrical Engineers
ACTON, LONDON, W.3

Members of the British Ignition Apparatus Assn.

ALL about the Post-War A.B.C.

Shall we tell you it?

Sorry! But we cannot—at present. We will tell you all about it in good time.

Meantime, take this advice.

Hold back your order until we have divulged our secret.

We will tell you this much about the post-war A.B.C.

It will be an "eye-opener" in motor cycle design, construction, and performance.

It will be a great development on the pre-war A.B.C., which outclassed all others in engineering achievement and in road performance.

It will embody some of the master features gained in producing the A.B.C. aero engine.

It will be available to the public soon after the war, as arrangements for mass production in thousands are already completed.

A.B.C. THE WORLD'S BEST MOTOR-CYCLE (COPYRIGHT)

A.B.C. MOTORS, LTD.,
WALTON-ON-THAMES

'Phone: Walton-on-Thames, 220.
'Grams: Revs, Walton-on-Thames

TO COUNTRY CUSTOMERS

This week we have a few words to say to our Country Customers, past and future. It has come to our notice that some misunderstanding has arisen over the railway regulations, etc., which would be well dispelled. Therefore we wish to bring the following facts to all our country clients.

a. **Sending Motor Cycles by Rail.**
Motor Cycles may be sent at the present time by goods train from any part of the country to London and *vice versa*, no permit being required. In the rare event of a client experiencing difficulty in sending his machine to us for sale or exchange, he is advised to communicate the fact to us, and we can make arrangements for its acceptance by goods train. Irish customers can also forward their machines by Steamer.

b. **Dealing at a Distance.**
Distance is no bar to selling, purchasing, or exchanging a machine. We despatch machines to, and receive them from, all parts of the British Isles, England, Ireland, Scotland, Wales, Isle of Man, Isle of Wight, Channel Isles, etc. If in doubt, write us as to the best way of forwarding.

c. **Safeguarding Country Customers.**
a. In direct sales, all our machines, unless specifically stated otherwise, are sold under a three months' guarantee —the same guarantee as is given by the makers when the machine is new.

In addition, we are always willing to take back any machine sold within three weeks of purchase, for anything else from our stock of 200 machines, should the machine chosen in any way whatsoever not prove satisfactory or suitable.

b. In exchange deals. When you offer us an exchange deal, we do not quote you an attractive "approximate" price, and then, when we have got your machine, try and beat you down. Instead, we send you a form to fill up, giving full details of your machine, and when you send this back to us we quote you *an exact* price, which we adhere to, unless your description is very inaccurate. No exchange deals are binding until *both* sides are agreed on the exchange price. The same guarantees and exchange offers apply as with a direct cash sale. We pay carriage one way in exchanges.

d. **Risk of Damage in Transit.**
The risk of damage in transit is negligible, provided that the sidecar is detached in the case of a combination, and the accessories sent separately, and the tank protected with wrapping in all cases.

e. **Why You should Deal with Us.**
Our stock of machines is the largest in London, and, we believe, in England. Because we are in London, we can offer you a far bigger choice than you can obtain locally. You are amply safeguarded by our guarantees and exchange offers, and we give you prompt attention and satisfaction.

f. **Instalments.**
Write for details of our instalment scheme, by which you can reserve a machine for after the War and pay by small instalments *now*.

g. **We Pay Cash for Good Machines.**

NO PERMITS are required for any of the selection from stock given below:

ALLON, 1916, 2-speed, 2-stroke ..... 29 gns.
BRADBURY, 1913, 4 h.p., 2-speed, re-enamelled ..... 29 gns.
BAT-J.A.P., 1914, 6 h.p., 3-speed, re-enamelled ..... 39 gns.
CLYNO, 2-speed, 2-stroke, hand-clutch ..... 27 gns.
CALTHORPE-J.A.P., 1916, 2-speed, clutch, 2¾ h.p. ..... 29 gns.
CENTAUR, 1913, 3½ h.p., 2-speed, clutch ..... 32 gns.
DOUGLAS, 1914, T.T., 2-speed, re-enamelled ..... 39 gns.
DOUGLAS, 1914, T.T., 2-speed, standard ..... 34 gns.
DOUGLAS, 1913, T.T., 2-speed, standard ..... 29 gns.
ENFIELD, 1916, 3 h.p., 2-speed, clutch, kick-starter ..... 42 gns.
F.N., 1913, 5-6 h.p., 4-cylinder, 2-speed, clutch ..... 27 gns.
GRANDEX-PRECISION, 1914, 3 h.p., 2-speed, clutch ..... 24 gns.
HARLEY-DAVIDSON, 1915, 7-9 h.p., 3-speed coachbuilt Combination, dynamo lighting ..... 65 gns.
HARLEY-DAVIDSON, 1915, 7-9 h.p., 3-speed, dynamo light, overhauled by makers, fitted discs, T.T. bars, re-enamelled khaki .. 68 gns.
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RUDGE-MULTI, T.T., 1916 I.O.M. racer ..... 59 gns.
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RUDGE-MULTI, 1914, 3½ h.p., re-enamelled ..... 37 gns.
RUDGE-MULTI, 1913, 3½ h.p., standard ..... 28 gns.
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RUDGE, 1914, 3½ h.p., T.T., Philipson, re-enamelled ..... 26 gns.
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CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

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1916 A.J.S., 6h.p., lamps, horn, speedometer, as new; £80.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

1917 6h.p. A.J.S., with Phœnix sporting sidecar, bought new March, 1918, mileage 4,000, painted khaki, lined black and gold, all accessories, in splendid condition; £125 cash, no offers; may be seen any day.—Capt. Hartland, Agricultural Distribution Centre, Hereford. [X9454

Alldays.

ALLON, 2¾h.p., 2-stroke, 2-speed, low mileage, new condition throughout, with lamps and horn; £34.—97, Pendle Rd., Streatham, S.W. [X9448

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £48; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8760

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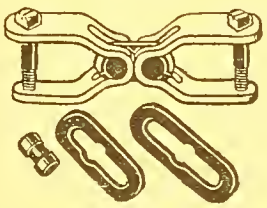

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MOTOR CYCLES FOR SALE.

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CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

ARIEL, 3½h.p., and sidecar, 3-speed, perfect order; £30.—Walker, Water Works, Chipstead, Surrey. [9453

ARIEL 1918 5-6h.p. Twin Combination, recently overhauled, two new wheels, fitted throughout 2½ Dunlops, one brand new, Lucas lamps, sidecar and rear new, tools, spares; bargain, £70.—Brown, Grange Villas, Wallsend-on-Tyne. [X9442

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WALL Auto-Wheel (engine No. 3,337), with shock absorber; £7/10.—Bartlett, 75, Muswell Av., London, N.10. [X9465

Bradbury.

4h.p. 1913 3-speed Bradbury, good; £22/10.—27, High St., Doncaster. [9318

BRADBURY, 4h.p., 2-speed, and sidecar; great bargain, £28/10; trial any time.—1, Gunnersbury Lane, Acton Hill, London. [9419

1915 6h.p. Bradbury and Sidecar, horn, speedometer, electric light, really perfect order, enamel splendid; £65.—Walker, Water Works, Chipstead, Surrey. [9452

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4¼h.p. B.S.A. Combination, accumulator lighting, like new; £70.—27, High St., Doncaster. [9320

1915 B.S.A. and Millford sidecar, complete, lamps, etc.; £59.—Cross, Jeweller, Rotherham. [X9475

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B.S.A., 1914-15, all-chain drive, in splendid condition; a sacrifice at £40, no offers.—9, Woodville Terrace, Gravesend. [9364

B.S.A., 1917, 4¼h.p., perfect throughout, 3-speed, chain-cum-belt, fitted Dunlop tyres.—Apply, Mitchell, 102, Lee Rd., Lee Green. [9353

B.S.A. 1916 Model K. (belt-cum-chain), practically new; £58, including lamps and horn; a bargain.—Barty, 26, Stone St., Gravesend. [9363

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1916 Calthorpe, 2-stroke, lamps and horn, splendid condition; £30.—Parker and Son, St. Ives, Hunts. [9325

CALTHORPE, 1916, 2-stroke, T.T., 2 speeds, oversize tyres; £26.—51, Maplethorpe Rd., Thornton Heath, S.E. [9395

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CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

CALTHORPE-J.A.P., late 1916, 2¼h.p., 2-speed, excellent condition throughout, sloping tank model; price 28 gns.—46, Hillcrest Rd., Acton. 'Phone: 1578 Chiswick. [9416

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DOUGLAS, 1915 Colonial Model, 3-speed, T.T., lamps, etc., new condition; £45.—54, Strode Rd., Willesden, N.W.10. [9314

DOUGLAS, 1914, 2¾h.p., 2-speed, stored during war, exceptional condition; £40.—40, Broughton St., Beeston, Notts. [X9477

1915 Douglas, 2¾h.p., 2-speed, good condition; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

1914 4h.p., 2-speed, clutch, lamp, very good condition; genuine bargain, £32/10.—Renier, 14, Norman Av., Twickenham. [9347

DOUGLAS, 1914, 2 speeds, clutch, kick starter, top-hole condition; owner away; £36.—Write to 35, Mile End Rd., London, E. [9308

1914 4h.p. Douglas Coachbuilt Combination, fully equipped, disc wheels, sporty, nice order; £47/10.—436, Whitehorse Rd., Thornton Heath. [9411

2¾h.p. Douglas, late 1912, 2 speeds, T.T. bars, frame, tank re-enamelled, used twice since 1915, lamp, horn; £30.—8, Lancaster Rd., Leytonstone, E.11. [9352

DOUGLAS, 2¾h.p., condition practically new, 2-speed, accessories; best offer, or exchange good twin.—50, Perkins Rd., Newbury Park, Ilford, Essex. [9334

DOUGLAS, 1914, 2-speed, complete with lamps, horn, and knee-grips, 36 gns.; 1916 ditto, 50 gns.; lady's ditto, £29; E.I. or exchange.—Service Co., 292, High Holborn, W.C.1. [8739

DOUGLAS, 1913.—Stripping two. Say wants and what you will pay.—Birmingham House, Meadow St., Portsmouth. [X9388

Enfield.

ENFIELD, 2¾h.p., chain drive, overhauled, perfect; £15; also gent's cycle.—Owner, 34, Magdala Rd., N.19. [9408

1915 3h.p. Enfield, 2-speed, not used for 12 months, splendid condition; £40.—Parker and Son, St. Ives, Hunts. [9526

ROYAL Enfield, 1912, 2¾h.p., chain drive, Bosch mag., P. and H. lamp, overhauled; £15.—Write, 1, Campbell Rd., West Croydon. [9399

1917 6h.p. Enfield Combination, as new, horn, complete Lucas lamp set, special heavy studded back cover, little ridden; 90 gns.—Batten Bros., Cullompton. [X9473

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Humber.

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Indian.

1915 Indian, 7-9h.p., T.T. Model, excellent condition; bargain, £32.—Smith, 36, De Laune St., Kennington, S.E.19. [9425

INDIAN, 1916, 3-speed, clutch model, coachbuilt sidecar, and electric lighting, the whole in good running order, especially tyres.—Particulars and trial on application to Box L7,567, c/o *The Motor Cycle*. [9328

James.

JAMES 1914 4¼h.p. Combination, splendid condition, perfect mechanically; 40 gns.—47, Woodhouse St., Gorton, Manchester. [X9468

JAMES Combination, 1914, 4¼h.p., 3-speed countershaft, clutch, kick start, Binks carburetter; 45 gns.—Sgt. Crowe, A.S.C. Depot, New Ramp Sheds, Millwall Dock, E.14. [9402

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Levis.

LEVIS, 1915 model, 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

LEVIS, 1917 model, new machine, slightly shop-soiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St, Ledbury. [X7263

Matchless.

MATCHLESS 1918 War Model, spare wheel, mileage 400; £105.—51, Maplethorpe Rd., Thornton Heath. [9394

1917 8h.p. Matchless, complete, lamps, spare wheel, etc., done 800 miles; £110.—Cross, Agent, Rotherham. [X9474

MATCHLESS Combination, nearly new, hood, screen, lighting outfit; what offers?—Potts, Draper, Dartford. [9397

WE can give immediate delivery from stock of the new War Office Matchless combination, complete with spare wheel; £125.—Below.

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MATCHLESS War Model Combination, with spare wheel and tyre; £125; trade enquiry entertained; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [9345

MATCHLESS Combination, 1918, 8h.p. J.A.P., lamps, Klaxon horn, spare wheel, perfect order; any trial; £115, cost £135.—4, Gt. Western Rd., Paddington, W.9. 'Phone: 2417 Hampstead. [9313

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MATCHLESS 1918 War Model Combination, with spare wheel and tyre, slightly soiled; reduced to £119; seen any time.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

MATCHLESS.—Early deliveries of 8h.p. J.A.P. war model combination, spare wheel; £125; exchanges arranged. Now booking post-war deliveries.—Maudes', 100, Gt. Portland St., London, W.1 [7737

MATCHLESS, absolutely new combination, from stock, £125; also nearly new M.A.G. model, all lamps, speedometer, horn, Palmer cord tyres, hood and screen, spare wheel, a splendid outfit, £145; extended payments or exchange.—Service Co., 292, High Holborn, London. [8733

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MARTIN-J.A.P., 1912, 2¾h.p., very fast; £28, or offer.—1, Campbell Rd., West Croydon. [9400

MARTIN-J.A.P., 4h.p., T.T., very sporty, finest condition; £25.—Write to 35, Mile End Rd., London. [9309

New Hudson.

NEW Hudson, 1913-14, 3½h.p., free engine, 3-speed gear complete; no reasonable offer refused.—Harland Engineering Co., 66, Carrick St., Glasgow. [X9301

NEW Hudson, J.A.P. engine, 4h.p., 3-speed, clutch, coachbuilt sidecar, perfect condition; any trial; £38, or offer.—Lonsdale, Abermaw, Bath Rd., Dartford. [9321

NEW Hudson-Jap, 3½h.p., engine and 3-speed gear just overhauled, Bosch mag., all lamps and accessories; bargain, £25.—Lieut. Guyatt, Ely, Cambs. [X9405

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CROW Bros., Guildford.—New Imperial, all models, new and second-hand, in stock. [5371

NEW Imperial Motor Cycles.—2-speed, standard, and lady's models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0956

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

The Justification of Optimism.

THE rapid developments in the military situation undoubtedly have caused many members of the trade to think of the dangers of procrastination. Certain it is most manufacturers of munitions had developed the habit of thinking that it would be a long war, and that no undue haste was necessary to formulate plans for post-war business. Among the munition makers is the motor cycle industry, and those who have been compelled to convert their factories to meet the nation's need, as distinct from those who have continued to produce their normal products for the same purpose, are now faced with the disturbing potentiality that the necessity to change over again will come before they are ready. Were the bulk of the war contracts to be cancelled, the industry as a whole would not be prepared to meet the new conditions. This is now realised, and probably the most disturbing thought in the trade is that with the favoured few no change over will be necessary. These firms which are supplying large numbers of motor cycles to the Governments are in an ideal position to divert their energies immediately into civil channels. By many it is thought that they are in the position to flood the markets at home and abroad, and "dig themselves in," as it were, before the less fortunate makers are in a position to deliver either new or old models.

No Cause for Pessimism.

A contemporary has taken a most pessimistic view of the matter, and while this in itself will not cause alarm, probably our friends in the Trade will expect our views, since they have looked to *The Motor Cycle* to watch the trend of events, as it has done for upwards of fifteen years.

No one expects that the cessation of hostilities will be followed *immediately* by the return to pre-war conditions. The motor cycle industry particularly may be affected in several ways until petrol restrictions are entirely removed. Some manufacturers will be in a better position than others to keep factories running, but it is almost certain that their outputs will be restricted to a large extent, especially if material is rationed for the period immediately after the war.

With these things in mind, the ex-motor cycle maker on munitions can assume that, although he may have a great deal to do, by no means is he entirely outclassed in the race for post-war trade. By the time the fuel is procurable in unlimited quantities he should be ready to take his share of the trade that is bound to follow the flag of victory.

The Utility Motor Cycle.

Before the war, the motor cycle had scarcely come into its own as a utility machine. To-day, in Sheffield alone, there are upwards of 700 motor cyclists permitted to use their machines as being necessary to reach their work. It is doubtful whether ten per cent. of these riders were owners before the war. This great increase is general in many parts of the country.

Prior to the war, the motor cycle was almost purely a pleasure machine. The figures given by the Inland Revenue Department during the restrictions showed that a large number of machines were in use for utilitarian purposes alone.

There are thousands—one might almost say hundreds of thousands—of men, who before the war were not in a position to take up the pastime, but are now eagerly waiting for the time to come when they may purchase a motor cycle and use it. One has only to meet a party of mechanics and to discuss with them their ideas on the future to learn that fully fifty per cent. are thinking of motor cycles.

In addition, one must agree that the skilled working man has proved his worth during the war, and when normal conditions prevail he will be in receipt of a higher wage than he received prior to 1914. Among this class of the com-

An index to the advertisements in this issue will be found on the page facing the back cover.

The Justification of Optimism.—

munity there is a large and steady yearly crop of potential buyers.

Again, the Army has brought hundreds of thousands of young men into direct touch with the internal combustion engine. Thousands of them will join our ranks at the first opportunity.

It is almost safe to say that every other man one meets in khaki, blue, or civilian garb, is a potential buyer of a motor vehicle of one type or another. Hundreds of thousands of small shopkeepers have made money, and many of them will buy cars or motor cycles.

It has to be remembered also that for four years practically no machines have been built for the public. Boys have been growing up; had it not been for the war many would have been motor cyclists two or three years ago. Then there are the "old" motor cyclists: they, because they motor cycled in pre-war days, will regard themselves as "old-timers" or "veterans." One could add to the list indefinitely.

It is certain that there will be an enormous demand for British-built machines immediately the fuel restrictions are relaxed, and in the meantime colonial and foreign trade will take all for which shipping accommodation can be found.

So much depends on the Government, that it behoves the motor trade organisations to see that the interests of the trade are not overlooked by the authorities. To foster home trade the fuel restrictions must be relaxed immediately the demands of the fighting forces become less vital, and, for export business, ships must be found to carry the machines required by our friends overseas.

That there will be a shipping shortage is anticipated, but to help the nation to recuperate exports will be important. The powers that be will appreciate this, and probably room will be found for a certain tonnage in every transport used for the return of the colonial troops.

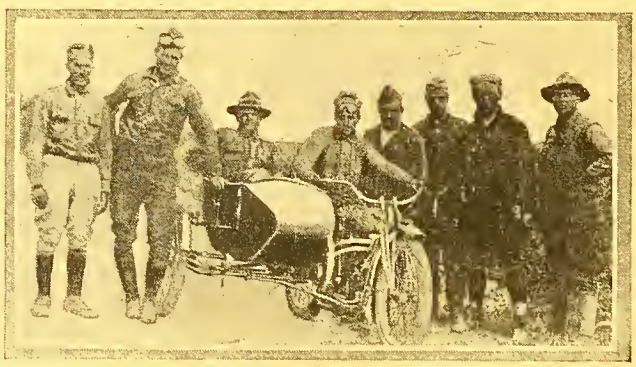
The greatest question will not be creating demand to meet the supply, but finding material to meet the demand. Material is the one vital factor in the rebuilding of the nation's commerce. That the motor cycle industry will get *its share* is certain, but materials will not be "unlimited" for several years to some, and that fact alone will regulate supply.

Everything considered, there is no need to take extreme views in any direction—there are so many factors to be considered—but the least reasonable view is that which includes a pessimistic prophecy of slumps and disaster.

SPRING FORKS.

British and American Machines on War Service.

ONE frequently hears that, as the American machine has been developed under more strenuous conditions than the British motor cycle, comparisons between American and British spring forks often are in favour of the former, perhaps because the American forks have a much more hefty appearance than those on our machines. There can be no doubt that the co-operative designing board which settled all the points of the Liberty motor cycle for use with the U.S. forces (which machine apparently has not fructified) did not think that they could learn anything from the British models which had been on war service for three years. According to the statement of an American corporal-mechanic in France, published in an American paper, *every machine* "in dock" for repairs *has the front forks* twisted. This is not a common complaint from our D.R.'s, and it would be interesting to know how the forks on British machines have withstood the rough usage.



American linesmen with their sidecar outfit laying telephone wires at the back of the lines in France.

The experiences of D.R.'s of both countries on this point would perhaps show which are the best types of forks. Makers, too, could supply valuable information.

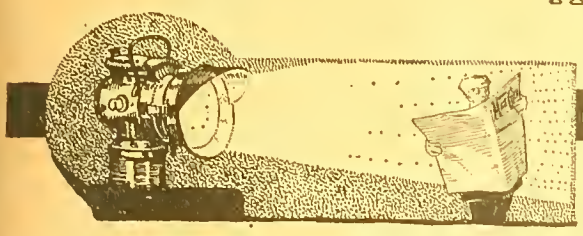
THE READING STANDARD FOR 1919.

LIKE its contemporaries, the Reading Standard, from motives of national economy, is to be marketed in only one model, optionally fitted with electric lighting equipment. There are no radical alterations on the 1918 model except that the engine is slightly larger, 85.7 mm. × 101.6 mm. twin, totalling 1,170 c.c. and giving 16 h.p. on the brake.

The minor alterations include larger valve ports and specially constructed exhaust valve. The transmission embodies the usual three-speed sliding gear which has been improved in detail, principally with regard to oil-retaining qualities. The cushion sprocket is of the type used by the Royal Enfield in this country, having rubber blocks to replace the more usual coil springs.

The carrier and front wheel are offered as extras on proof that they are absolutely essential for the use for which the machine is purchased. In the States the prices are £77 and £70 for the electrically equipped and the ordinary model respectively.

AS



Occasional Comments

"By Ixion"

Another Post-war Problem.

FROM the technical and riding standpoints it is exceedingly unfortunate that motor cycle lighting dynamos were not perfected before the war. If we can trust the electrical firms, a good dynamo outfit for solo machines is now technically possible. The two possible alternatives are (*a*) for motor cycle makers to build a dynamo set into their machines, and (*b*) for individual customers to add a dynamo after purchase. The latter is a tiresome and wasteful system. The dynamo maker has to design and market twenty different types of transmissions and brackets, the customer has to fit them: and, when fitted, they are not invariably satisfactory. Yet the first alternative will restrict the use of dynamos to machines de luxe. In pre-war days the motor cycle manufacturer did not supply lamps. If he attempts to standardise a dynamo after the war, up will soar his prices by £10 or more. His price without a dynamo will necessarily be steepish, with taxes, wages, and cost of material at their new levels. So the average manufacturer will not fit any lamps at all: and those who want dynamos will have to gain them as best they can, whilst the store bins of such firms as Lucas will be cluttered up with umpteen dynamo drives and brackets. It is a great pity, and also an additional grievance against Fritz.

Dispassionately!

I READ with great interest, blotched with spasms of amusement, Mr. H. G. Morgan's "dispassionate" thesis on three-wheelers. I agree with most of what he says, but some of his "facts in support" betray the hand of the shrewd propagandist. For example, as a counterblast to the suggestion that a three-wheel track is unsuited to rough roads, he reminds us of the Morgan's feats on A.C.U. precipices. Oh, Mr. Morgan, dost thou not know why the Morgan has scored all these hill-climbing stunts? I have watched most of them, and noticed that the three-wheel track and single-driver were grievous handicaps which the other merits of this gorgeous little 'bus successfully surmounted. I have seen its most famous driver essay steep climbs with a colossal-type suit case on a Gotha-sized back carrier, and yet his back wheel barely gripped, whilst the sickly smell of charred tyre surmounted the noisome odours of burnt oil distributed by his predecessors. Every sane man knows why the Morgan usually beats light cars in climbing stunts, nor is Mr. Morgan as innocent as he would have us believe. The question of one driver *v.* two does not affect it. The Morgan has 8 h.p. at its disposal, and its official weight is low (it was once advertised as 2¼ cwt.) The average light car boasts 10 h.p. and scales 12 cwt. So far as three tracks and rough going are concerned, Mr. Morgan may infer that a single-driver can usually pick out a narrow strip of biteable road, whereas two-drivers on a differential axle may not both enjoy a hard surface, and if one slips, the other is useless. It sounds pretty, but though I have repeatedly seen a single-driver fail to get a grip, I have yet to see a four-wheeler stalled by wheel slip in a pukka competition. Again, it is more than dubious whether a differential is more prone to side-slip than a single-driver. I have driven thousands of miles on cars with no differential, and they side-slipped more than similar cars possessing differentials. I think Mr. Morgan weakens a sound case by dragging in questionable arguments: about the main facts there is no doubt at all, for the Morgan is perfectly safe and steady.

The Safety of Three-wheelers.

ANY conceivable type of motor vehicle can be "turned over on grease," or even on bone-dry roads, but it is gross libel on modern three-wheelers to suggest that they are particularly liable to such catastrophes. Technically, they are fractionally easier to upset than most four-wheelers. The single driving wheel can never get quite such a sound grip of the road as a pair of wheels affords. If the front wheels side-slip, the solitary rear wheel offers less lateral resistance than two: if the driving wheel side-slips, it cannot call to a more stable companion for assistance. But in actual road practice the difference between three and four wheels in this respect is barely appreciable. I have driven many miles on Morgans, and I drive them "blue" as a very light, highly-powered vehicle shrieks to be driven: and I have yet to turn one over. My opinion, for what it is worth, is that I would hesitate to go out with a man who upsets Morgans—I should blame the driver, and not the 'bus.

A Loose Lamp Bracket.

ONE of my correspondents retails an exciting experience with a combined lamp and generator bracket. One of the nuts securing the handle-bar bracket shook loose. The tail of the bracket drooped, and the two arms embraced the plunger of his drip-feed lubricator, which happened to be "up" at the time. Consequently his steering was suddenly locked. The particular circumstances described apply only to one or two machines: while it is a common occurrence for a lamp bracket to shake loose it is seldom that the oiling handle is located so far forward. Still, his letter raises once more the whole question of the supply and mounting of accessories. Manufacturers of motor cycles, by contrast with car manufacturers, almost invariably behave as if riders used no accessories. The machine contains no provision for the fixing of hooters, speedometers, lamps, generators, etc., and we stick them on as best we can. If we buy cheap fittings they jangle about or fall off. If we buy first-class accessories we have to pay very steep prices, because the mounting brackets are necessarily complicated manufacturing jobs. The wily birds amongst us usually lag the handle-bar with insulating tape and buy oversize brackets.

The Lady Motor Cyclist and Her Mount.

From Sidecar to Saddle. The Evolution of the Lady Rider.

THE majority of sidecar passengers agree that sidecarring is very enjoyable. Some there are, however, who prefer moderately short journeys because they find a long journey in a sidecar becomes a little monotonous.

Any motor cyclist who has been a passenger on a long journey will appreciate that there is no comparison between riding in the sidecar and driving the combination, and after about 3,000 miles as a passenger in the 1914 trials I can fully understand why certain ladies of my acquaintance have boldly stated that, except for the evening "potter round," they prefer a bicycle to the seat in a sidecar.

With these ladies the novelty of sidecarring has worn off. Some have not experienced all the comforts of an up-to-date, nicely sprung, and upholstered sidecar, and in several cases over-enthusiastic husbands bent on making long non-stop runs at high speed with sporting sidecars which they would not tolerate were they called upon to occupy them, have done much to rob the sidecar of its joys.

Temperament and Torture.

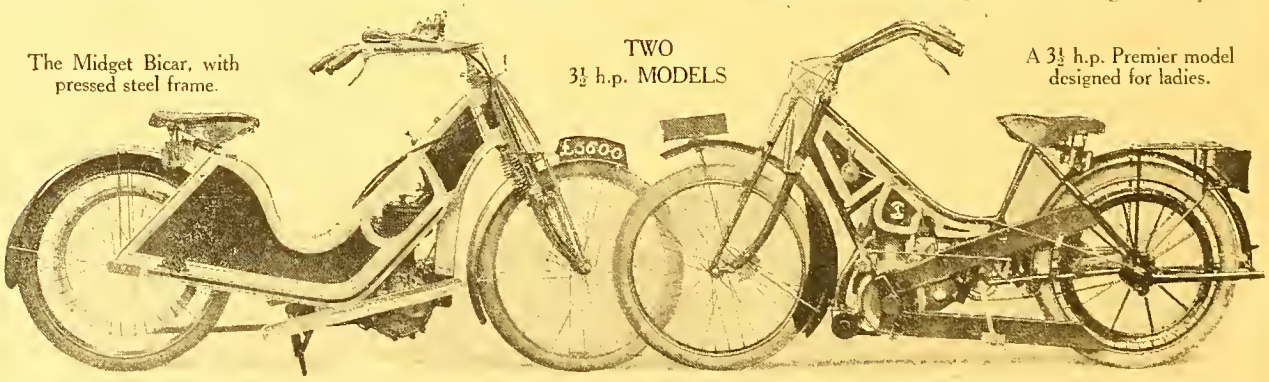
There is also the question of temperament. Some ladies like to lie back in a sidecar and enjoy the exhilaration of motion. Others are more active. They are not content to see only the bottoms of the hedgerows from the seat of a low-built sidecar. To sit inactive, hour after hour, in a sidecar body fitting them like a glove, is not only monotonous but it is very tiring. When a thoughtless driver insists upon using the body of the sidecar as a storage receptacle for spares and bulky tools, a sidecar loses all its comforts, and, after a few miles, it easily becomes a chair of torture.

Post-war Aspirations.

Just to recline and watch the driver and listen to the engine while a misty panorama streaks by is not sufficient for some ladies. The great majority of the fair sex like speed, but they also require to see something or do something. They must have much higher seats or they must have a machine to handle themselves.

For this reason many ex-sidecar couples of pre-war days probably will use two solo machines when motoring is resumed. While some of the fair aspirants to the power machine now are thinking of lightweights and motorised bicycles, once they have experienced the joy of power and speed at their finger tips they will want more, just as men have wanted more. With this in mind, I look forward to seeing quite a large number of ladies riding solo on every type of machine, from the smallest lightweight to the big four-cylinder

TWO
3½ h.p. MODELS



The Midget Bicar, with pressed steel frame.

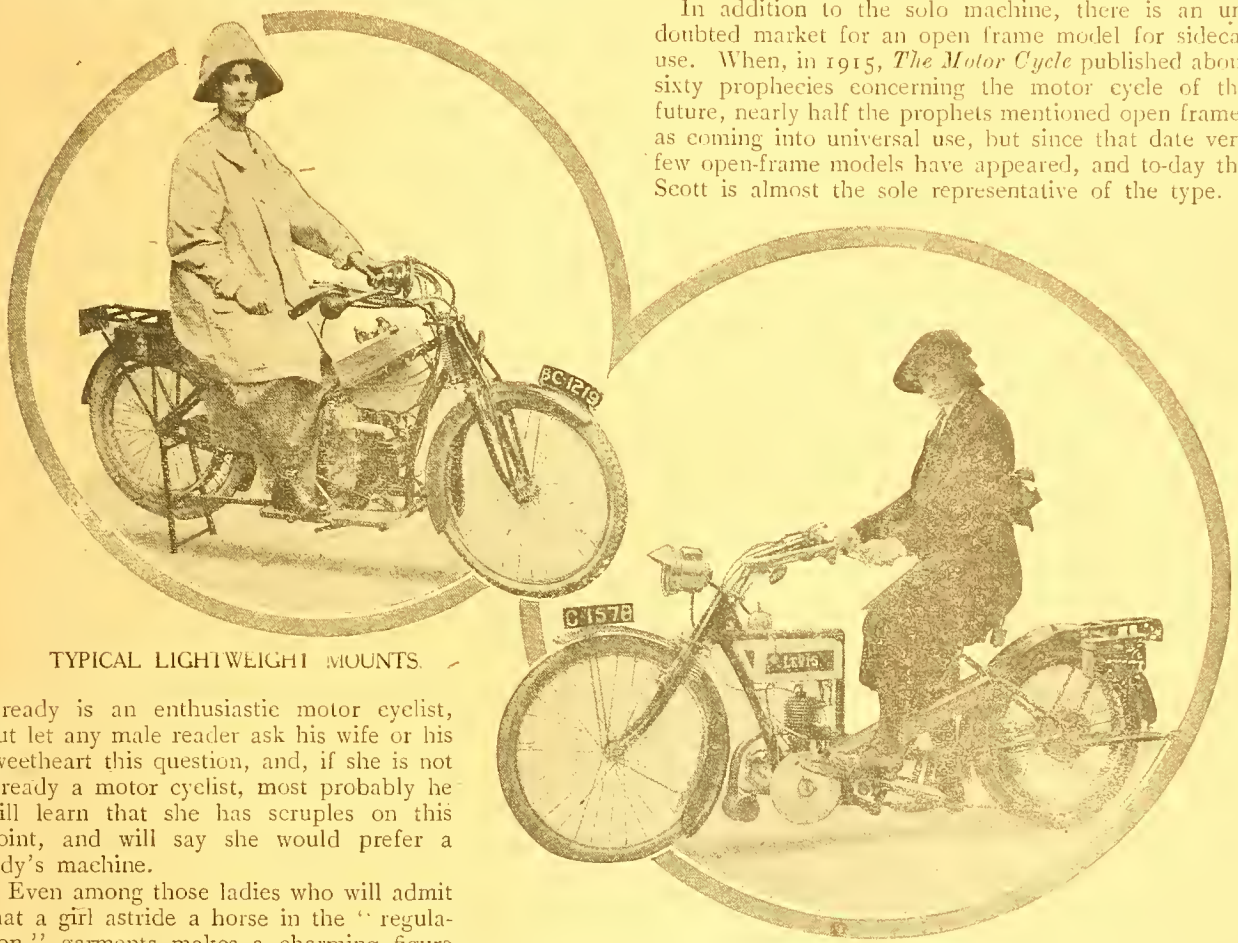
A 3½ h.p. Premier model designed for ladies.

The Lady Motor Cyclist and Her Mount.—

mount, which sooner or later will take its place in the range of British motor cycles.

Recently I was in conversation on this subject with one of our leading motor cycle makers, and he agreed that a far greater number of ladies would ride motor cycles after the war, but he appeared to be under the impression that, as the war had removed many of Mother Grundy's rules of propriety, the lady rider of the future will be content to sit astride a man's machine.

I rather expect almost every fair reader of *The Motor Cycle* will agree with him, because every such lady



TYPICAL LIGHTWEIGHT MOUNTS.

already is an enthusiastic motor cyclist, but let any male reader ask his wife or his sweetheart this question, and, if she is not already a motor cyclist, most probably he will learn that she has scruples on this point, and will say she would prefer a lady's machine.

Even among those ladies who will admit that a girl astride a horse in the "regulation" garments makes a charming figure there are many who know that they would not do the same themselves. There are many potential lady motorists who are matrons adding avoirdupois as the passing years rob them of their youth, and in their mind to ride a horse astride or to ride a man's motor cycle would be somewhat out of keeping with their years or their figures. Apart from any question of propriety, however, one cannot kill the prejudices of a life-time just because the war has brought into existence the splendid new type of young womanhood at present represented by the land workers, the W.A.A.C.'s, Wrens, and the R.A.F. lady drivers.

The Need for Special Designs.

Hence, when everything is considered, one must acknowledge that special machines are desirable if the pastime of motor cycling is to become as popular with the fair sex as cycling, which, incidentally, would lose its popularity at once if makers decided to make one pattern only—with diamond frame.

Just before the war almost every maker of a lightweight recognised the growing demand for the lady's machine and catalogued a suitable model. Very few makers of larger powered machines did this, and, excepting isolated cases where special machines have been built to order, the 3½, 5-6, and 8 h.p. classes were almost entirely neglected.

Open Frame Sidecar Models.

In addition to the solo machine, there is an undoubted market for an open frame model for sidecar use. When, in 1915, *The Motor Cycle* published about sixty propheeies concerning the motor cycle of the future, nearly half the prophets mentioned open frames as coming into universal use, but since that date very few open-frame models have appeared, and to-day the Scott is almost the sole representative of the type.

The Douglas 2¾ h.p. and the two-stroke Levis.

Designers of the higher-powered lady's machines should bear in mind that they may be required for sidecar work. I recall that one maker of a particularly sturdy single, which had earned a good reputation as a sidecar machine, refused to guarantee his lady's model if used with a sidecar. It is absurd to market a machine weighing upwards of 300 lb. and having an engine sufficiently powerful for sidecar work, unless the frame is designed for withstanding the strains and stresses when a sidecar is attached.

Probably the most suitable power unit for a lady's solo machine is a flat twin of about 2¾ h.p. It is easy to start, it is light, and the vibration is less than any other type. The even torque, too, renders the machine less prone to skid in grease. With this form of engine

The Lady Motor Cyclist and her Mount.—

an open frame can be used which will be rigid. Lateral rigidity is an essential if the danger of skidding is to be reduced to the minimum. The single-cylinder engine is so easy to fix in a frame following the conventional lines of the bicycle of both "lady's" and "gent's" types that it is not surprising that, in the past, makers have followed the line of least resistance, with the result that there has been considerable whip in most frames of motor cycles with single-cylinder engines designed for ladies. The lady's pedal cycle whips very considerably, and when the weight of an engine is carried at the very point where the whip takes place, *i.e.*, at the bottom bracket, the faults of the open bicycle frame are accentuated.

There is another point where some designers have failed in the past. They have not given sufficient attention to the question of "dress guarding." In some machines this appears to have been overlooked until the machine was finished otherwise. The introduction of the countershaft gear has rendered the transmission easier to enclose, and the usual standard chain covers have only to be supplemented by protection of the rear wheel.

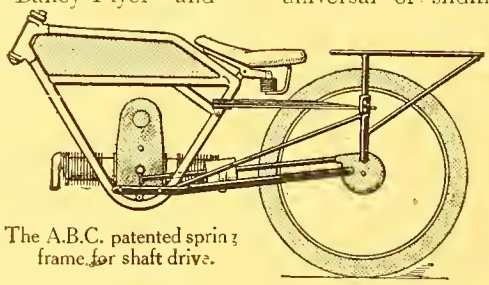
To be quite suitable for a lady a machine should have a clean engine. But this is a point upon which fully 50% of existing machines fail. Dirty and noisy engines have done more to retard the progress of popularity than anything else. For every pre-war rider there are at least a dozen potential riders of a machine that is reasonably quiet and clean to ride. One does not so much mind the dust, but dust plus oil makes motor cycling a somewhat dirty pastime. Male riders can combat this disadvantage by wearing overalls, but a lady will demand that she shall look well on a machine after a long run, and it depends largely upon our engine designers whether she can be convinced that this is possible.

VEDETTE.

A SHAFT-DRIVEN A.B.C.?

A New Spring Frame Patent embodying a Novel Feature.

ALTHOUGH at first sight it appears that the opposed twin engine is the least suitable type for shaft transmission, it would not be surprising if the two are developed side by side. In America there is such a combination—the Bailey-Flyer—and it is interesting to note that two "flat twin concerns" in this country have included shaft transmission among their recent patents. We refer to the Raleigh and the A.B.C. companies. The former firm's detachable wheel patent in connection with shaft drive was illustrated in our issue for Nov. 7th, and the A.B.C. Co.'s latest spring frame design, which is illustrated as applied to a shaft-driven machine, is published here.



The A.B.C. patented spring frame for shaft drive.

The Movable Engine.

In this case, however, the patent is equally valuable for a chain-driven machine, and relates to an arrangement of engine and transmission by which the relative movements of frame and wheel in a spring frame machine do not affect the centres of driving and driven members.

It will be seen that the engine is carried on a sub-frame, which includes the lower rear stays of the machine, and which is pivoted to the main frame directly under the engine, so that as the wheel moves in a vertical direction the engine moves slightly, radially from the pivoting point directly below the centre of the engine. Hence it would be necessary to fit flexible connections between engine and petrol and oil tanks.

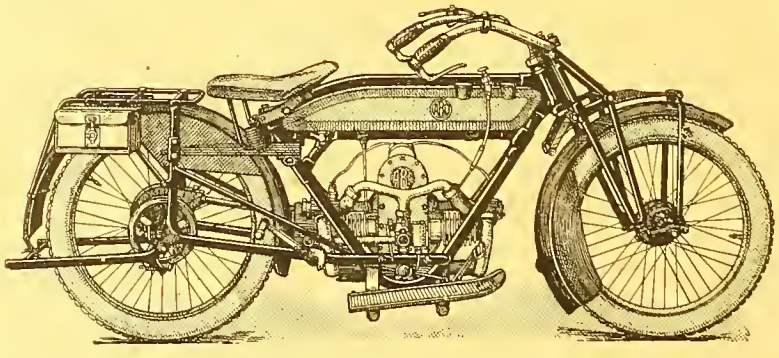
With shaft transmission, it is not necessary to use universal or sliding joints while neither radius rods with hinge joints nor shackles to the springs are required. The unsprung weight is reduced to a minimum.

Why not a Sprung Carrier?

The sketch accompanying the patent specification reproduced here suggests that shaft transmission has been considered seriously by the A.B.C. company. As laid out in the sketch, the right angle drive at both ends of the shaft is by worm gearing, while the gear box is approximately midway between the two.

To those who favour the loop frame—and this type has very marked advantages not usually appreciated—the A.B.C. design will be specially interesting. It is, of course, of the duplex type.

Considering the very many excellent features of the A.B.C. spring frames, both the standard model and the design illustrated here, it is to be regretted that a carrier which is part of the sprung portion of the frame is not embodied in the design as experienced motor cyclists know that many carriers of existing machines are useless for the carriage of luggage over roads such as are found in this country to-day.



Our artist's idea of how a shaft-driven A.B.C. would appear in its complete form.

NOTES ON CLUTCHES.

Can a Large Clutch suitably replace a Gear Box?

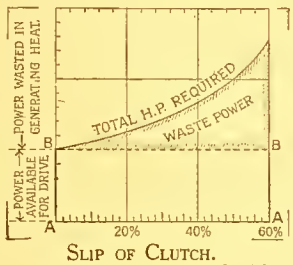
IN an issue of *The Motor Cycle* a few months ago a description was published of an American machine. There were several noteworthy features in this machine, but the one which concerns us at present was the absence of speed gears. A large clutch "capable of an indefinite amount of slipping" was fitted.

Probably all keen motor cyclists hanker after the utmost simplicity in design, and it is not surprising to find since the above-mentioned description was published—whether as a result of this or not I cannot say—that several writers have tentatively suggested that, given a large clutch of the capable-of-being-indefinitely-slipped variety, a gear box might be dispensed with even on small machines for solo work. In other words, it is hinted that such a clutch as mentioned would in itself be an effective variable gear.

Calculating the Power Losses.

In view of the above it will perhaps be of interest to investigate in a simple manner the conditions which must obtain in order that a single-geared machine may compare with a machine fitted with a gear box.

Let us imagine that we have (1) A three-speed machine of a certain engine capacity capable of climbing a severe test hill with lowest gear of 12½ to 1; (2) a machine (capacity of engine to be determined) single-geared 5 to 1 fitted with a (say) perfect clutch.



SLIP OF CLUTCH.

Let AB = h.p. required with a rigid drive low gear to perform certain work.

The diagram shows the extra power which would have to be supplied by an engine which had to do the same work—using a slipping clutch as a gear—for various % slips of clutch.

CLUTCH SLIP.

Let R = r.p.m. of engine or driving plates of clutch

r = r p.m. of driven plates of clutch

Then % clutch slip $= \left(\frac{R-r}{R}\right) 100$

Also if a machine has a normal gear of x to 1 and it is required to obtain a low gear of X to 1 by a slipping clutch, then necessary

% clutch slip $= \left(\frac{X-x}{X}\right) 100$

Seeing that No. 2 machine has a gear of 5 to 1 we know that with the lowest gear in use on No. 1 machine we can obtain $\frac{12\frac{1}{2}}{5}$ = two and a half times as many power impulses over a given distance. It is, therefore, evident that if we are to obtain the same number of power impulses over the same distance in the case of No. 2 machine we shall have to slip our clutch until the driver plates are running at two and a half times the speed of the driven plates. In this case we shall have a 60% slip. Now the conditions (*a*) speed of engine (*b*) speed of machine would be absolutely identical in the two cases if only—and it is a big "if"—the efficiency of the power transmission in the case of the clutch were equal to that of the gear. The latter being a rigid drive may be taken as transmitting the whole of the available power, but with the slipping clutch it is different, the efficiency of the transmission falling off as the clutch slip increases. Consequently, instead of the whole available power being used for turning the back wheel of the machine only 40% is effective, the remaining 60% being wasted in generating heat.

It is obvious, then, that if No. 2 machine is to equal the performance of No. 1 on the test hill it must be fitted with an engine approximately two and a half times the size of that fitted to No. 1, which is exactly what would be required if No. 2 machine were a rigid drive (and not a clutch model) machine geared 5 to 1.

It is now plain to us that when it is a question of obtaining a maximum amount of useful work from an engine the slipping clutch model is no better than a fixed gear machine of the same size and gear, and the hill which will baulk the fixed gear machine will also baulk the slipping clutch model in a fair climb with the rider in the saddle and his feet off the ground.

A slipping clutch, no matter how perfect in design or construction, is not and cannot be a speed gear, for a gear will transmit large or small powers with approximately the same degree of efficiency, but a slipping clutch, while it will readily transmit small powers with a large slip, will fail as soon as it is asked to transmit large powers with a large slip. A gear may be said to be a transformer of power, whereas a slipping clutch gives out a little power while wasting a lot.

It may be taken, then, that clutches cannot replace speed gears on those machines to which, because of their moderate engine capacity, it has been found necessary to fit speed gears. Practical experience has shown that the 500 c.c. Triumph and other makes, single geared, and fitted with various types of clutches, have not proved sufficiently attractive and useful to keep a market, and for my part I do not see that gears can be dispensed with on any machines under about 750 c.c. if the said machines are to be guaranteed to tackle any gradient. I will admit, however, that a solo of the latter size fitted with a large and suitable clutch on the engine shaft would make a fine model for the out and out speed merchant. He would be able to climb all the star pimples without fingering his clutch, yet start from a standstill or thread his way through traffic in as docile a fashion as the babiest two-stroke.

Revs. v. Power.

It must not be thought it is inferred in the foregoing that a clutch model has no advantage over a fixed gear model with the same gear ratio. Besides starting and traffic advantages, the clutch enables one to keep up the engine revs. at any time when necessary, and one may paddle or even walk a machine over the crest of a hill which would not be negotiable otherwise. But stress must again be laid on the fact that this increase in revving does not mean a *corresponding increase in power* as it would if the extra revs. were obtained by means of a low gear; it is really only a slipshod (no pun intended) method of getting over a difficulty at the expense of a great deal of waste power, and can never hope to compete with the orthodox gear box.

ENGRO.

CURRENT CHAT

SPECIAL FEATURES

THE LADY AND THE MOTOR CYCLE. WHICH TYPE?
WHY NOT A PETROL-ELECTRIC MOTOR CYCLE?

TIME TO LIGHT LAMPS

GREENWICH TIME.

Nov. 14th	... ...	4.41 p.m.
,, 16th	... ...	4.39 ,,
,, 18th	... ...	4.36 ,,
,, 20th	... ...	4.34 ,,

More Spring Frames.

The post-war Clyno has a spring frame.

The Armistice.

A new era dawns for the motor cycle with the signing of the armistice.

Larger Wheels.

Many of the "real post-war" models will have 28×3in. tyres.

Sh!

Makers seem rather reluctant to say anything about new models. There are two ways of reading silence: either something very special is on the board or nothing has been thought about yet.

The Work of the Red Cross.

A Harley-Davidson agent now serving with the American Army writes: "If you get a chance to boost the Red Cross in any way, do so, for it sure would be a Christian act. I have been up the line a while, and the Red Cross is doing wonderful work for the boys, and it's the kind that counts. That paragraph 'The Greatest Mother of Them All' sure hits the bull's-eye. I want you to rest assured that I am here to keep all the Harley-Davidsons running and in good shape."

Petrol for Discharged Soldiers.

The A.C.U. is now using every endeavour to persuade the Petrol Control Department to issue licences to discharged sailors and soldiers to enable them to get about in connection with their businesses.

The secretary, Mr T. W. Loughborough, is authorised to state by Sir Arthur Stanley, president of the British Red Cross Society and of the Auto Cycle Union, that this movement has his fullest sympathy and support. Sir Arthur is confident that the case only requires to be properly presented to the Controller for the special permits to be forthcoming, subject, of course, to any safeguards that may be found necessary to prevent its abuse.

It is the A.C.U. which has taken the first steps to obtain this concession, and the secretary will be glad to hear of any discharged and disabled sailor or soldier requiring a licence. The nature of the men's disabilities should be stated, together with the reasons why the licence is required. Application should be made to the Secretary, The Auto Cycle Union, 83, Pall Mall, London, S.W.1.

Yankee Advertising.

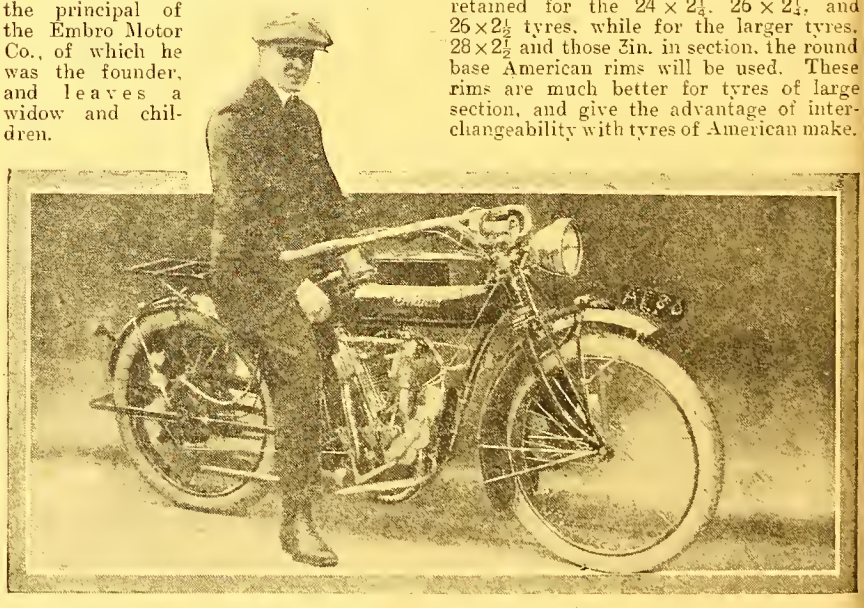
One of the recent Topical Budget pictures at the cinema was a record of the training of American D.R.'s. Riding through sand about 2ft. deep, and over an ordinary switchback track about 2ft. wide with some special bumping sleepers at a speed of about 30 m.p.h., were two of the training stunts. They certainly were well performed.

More Light.

The Secretary of the Auto Cycle Union has written to the Secretary of State for Home Affairs urging the removal of the present restrictions on the use of powerful lights on motor vehicles. He points out that the possibilities of assistance being given to enemy aircraft offered by a single vehicle using powerful lights, or a number of vehicles so lit indicating the position of a town or road, are now remote.

Death of a Prominent Motor Cyclist.

We regret to learn that the death occurred on October 30th, at Hull, of J. W. R. Ellis, a prominent trade rider in past trials and a competitor in most events in the North of England. He had several times ridden in the London-Edinburgh A.C.U. trials, and was captain of the Hull and East Riding A.C.C., as well as a member of several of the Northern clubs. At the time of his death (which was due to influenza) he was aged thirty-five and a sergeant in the Hull Motor Transport Volunteers, a large number of whom followed the remains at the funeral. Mr. Ellis was the principal of the Embro Motor Co., of which he was the founder, and leaves a widow and children.



The late Sgt. J. W. R. Ellis, of the Hull Motor Volunteers.

American Motor Cycle Machine Guns.

It will be remembered that this journal took the greatest possible interest in the motor cycle machine gun when first introduced to the British Army. The American Army are now using Lewis guns on a mounting which will serve for ordinary or anti-aircraft fire on Cygnet rear cars. From an illustration appearing in an American paper, the outfit looks most substantial, and of a kind to deal satisfactorily with the low-flying aeroplane.

Standardisation of Tyre Sizes.

The British Rubber Tyre Manufacturers' Association has now issued the report of its Standardisation Committee, which is being submitted to all manufacturers of cycles, motor cycles, cars, etc., in order to obtain their co-operation in an effort to limit the number of tyre and rim sizes used on new vehicles. It is intended to submit the proposals to the Technical Committee of the Motor Industry, and request that body to recommend them for standardisation by the British Standards Association.

So far as motor cycles are concerned, the recommendations include five diameters of rims, as against twenty different rims now listed. These will be for tyres of the following sizes: 24×2¼, 25×2¼, 26×2½, 28×2½, 26×3, and 28×3. The last three mentioned are American sizes. The suggested tyre sizes number six, against twenty-two at present listed.

The wired type of tyre and its rims are cut out entirely. The D section of rim is retained for the 24×2¼, 26×2¼, and 26×2½ tyres, while for the larger tyres, 28×2½ and those 3in. in section, the round base American rims will be used. These rims are much better for tyres of large section, and give the advantage of interchangeability with tyres of American make.

Economy and the U.S.A.

The Americans are anticipating a shortage of many things. One is of petrol. To combat this they have decided to abolish all motor and motor cycle racing.

Saving the Material.

Another source of economy is in connection with copper and steel. Front wheel stands, carriers, and extension sidecar axles are to be abolished. Brass and copper parts are to be eliminated wherever possible and other metals substituted. Nickel-plating will also be done away with. Zinc is to be utilised in place of sheet steel for various purposes, such as battery boxes, etc.

Rubber Substitutes.

Fibre and other patented substances are proposed to save the rubber used on handle-bars, footboards, pedals, etc.

Demobilisation.

It is said that demobilisation of the Army will be in accordance with two principles: (1.) Time of enlistment. (2.) The national importance of a man's civil occupation. All soldiers are to receive twenty-eight days' leave, with pay and allowances, before final discharge.

Work in the Garage.

We have lately seen many motor cycles and cars, which have been lying aside for want of petrol, in a dilapidated condition. Ordinary care seldom seems to be taken with tyres and plating. That month's leave our soldiers are to get on discharge can be profitably spent in the garage.

Reconstruction Lectures.

The series of lectures now being held by the Industrial Reconstruction Council is proving so popular that a second course has been arranged for next year. The first of these will be given by the Minister of Labour on Wednesday, January 8th. Other lectures will follow at fortnightly intervals by Judge Edward Parry, Mr. Ernest J. P. Benn, Mr. J. R. Clynes, M.P., Professor A. W. Kirkaldy, and the President of the Board of Education. The lectures will again be held, by the kind permission of the Saddlers' Company, in the Saddlers' Hall, Cheapside, at 4.30 p.m. A full prospectus of the series can be obtained from the Secretary, I.R.C., 2 and 4, Tudor Street, E.C.4.

A Big Movement in Industrial Reconstruction.

The Industrial Reconstruction Council and the Reconstruction Society have already formed a Joint Committee and planned a national campaign on the lines of the work which they have been doing for the past year, and which is having such a beneficial effect upon the attitude of mind of both capital and labour. There is no doubt that this first effort at co-ordination will meet with public approval, and will help to dispel the confusion which must inevitably arise when leagues and alliances, councils, committees, and societies are all apparently preaching the same gospel and covering the same ground.

This is the right moment for concentrated effort. The country is at last realising that peace is upon us and we are not ready. The two societies which are now joining hands have found it almost impossible to meet the demands made upon them for speakers and literature, and at none of the numerous meetings they have held have they been able to accommodate all who have attempted to secure admission.

If this sort of thing goes on and can be extended, there is every prospect that a better understanding may arise between capital and labour. We therefore welcome any movement which will give greater impetus to the missionary work which is still necessary.

Petrol for a Q.M.A.A.C. Driver.

A certain Q.M.A.A.C. driver attached to the A.S.C. appears to have reasonable cause to complain about present day restrictions and how they are applied. After working for over ninety hours per week for ten months in France, this lady obtained ten days' leave, of which five were spent travelling. She applied to H.Q. Irish Command for a petrol permit, which was granted, but on applying to the Area Petrol Controller for a driving permit, this was refused on the ground that she was neither officer nor man of H.M. Forces. We see no reasonable ground for this distinction.

Second-hand Prices.

There is little likelihood of war work ceasing quickly, even if general peace is declared. Most firms are in the midst of big contracts, for which they have the materials in the main and thousands of parts in a partly finished state. Such contracts will need to be "cleared up." After that, motor firms will be able to turn to post-war programmes, but deliveries will be impossible for months. As a result, "second-hand" prices will remain high, provided the Army does not release in thousands the cars and motor cycles, for which, it is supposed, it will have no further use. Popular rumour has it that the Army bargains in cars and motor cycles after the war will make one's mouth water. We shall see!

Shortage of Steel.

It is reported from Washington, U.S.A., that the warehouses of the world are practically bare of stocks of steel, which must necessarily be replenished. The coming of peace will not end this shortage.

A New Schebler Carburetter.

A new plain tube carburetter without moving parts, and intended for lightweights, has been introduced by the Schebler Co. In it is incorporated the pilot tube principle, which gives a full flow proportioned to and controlled by the air flow, and allows the incorporation in the nozzle itself of a reserve supply of fuel for acceleration. The only moving part of the carburetter is the throttle, which is of the piston type.

Photographic Work in Palestine.

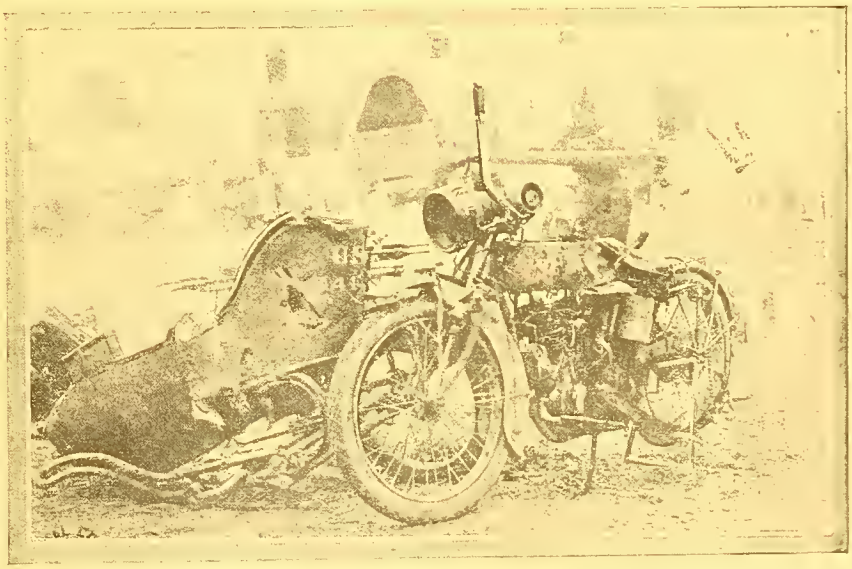
W. J. Brunell, the photographer, is on his way to Palestine *viâ* France and Italy on behalf of the Ministry of Information. He expects to be absent for a year or two. Goodness knows how many plates he will expose in that time, for Brunell used to snap right and left in motor cycling events, and it was his energetic work in this direction that brought him notoriety. He was with the A.I.D. prior to obtaining his latest appointment.

An Appeal to Motor Clubs.

The National Institute for the Blind is making arrangements to conduct through the National Carol League a special Christmas and New Year Appeal in aid of its work, which includes the after-care of soldiers and sailors blinded in the war.

Motor clubs existing in various parts of the country are being asked to promote a carol party, concert, or other entertainment to enable the League to extend its work both in the interest of our blinded heroes, of whom there are now over 1,200, and the blind community generally.

Clubs willing to assist are asked to communicate with Sir Arthur Pearson, Bart, C.B.E., National Carol League, 226, Great Portland Street, London, W1.



An Indian and sidecar after rough treatment by a Boche shell. A photograph taken on the Western Front.

KONKING, KNOCKING, AND TAPPING.

Engine Noises and what they Denote.

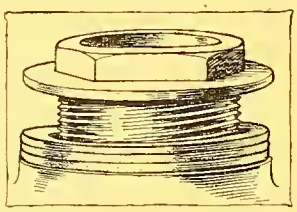
THERE is nothing which causes the inexperienced rider more exquisite agony and suspense than what he calls a knock. But there are knocks and knocks. There are healthy knocks and unhealthy ones, there are natural knocks and unnatural knocks, and, so far as it is possible to describe the various species on paper, these notes may assist in clearing the air for one or two of the younger generation.

The Editor of *The Motor Cycle* tells me that quite a large percentage of the queries he receives concern knocks. These generally come from the riders of one or two distinguished makes which are notorious knockers. Similarly the sergeant of every repair depot knows the machine with the incurable tap. Probably it is perfectly healthy, but every rider who tries it comes back with vague misgiving as to its physical fitness.

Now knocks can be divided into three species, as set forth above, and we will proceed to analyse these separate and distinct phases of the phenomena.

Konking.

Every engine konks when abused. The 3½ h.p. Bank Holiday outfit, with three or four aboard, probably konks every time the high gear is engaged, and similarly it konks itself to a standstill when too fierce a gradient is encountered. Very often the best and most perfectly tuned engines are the worst offenders in this respect, as, for instance, when a mount which is tuned for fast solo riding is abused by the attachment of a sidecar. To reduce the tendency in this case it is necessary slightly to alter the ignition timing, in which case the magneto setting should be altered also, and if the magneto setting is altered the valve timing similarly should be corrected, though space does not permit a detailed account of all this.



Reducing compression by means of brass rings or copper-asbestos washers.

Konking is the natural result of an engine being overloaded, and the best ways of avoiding it are, not to overload, or to buy a more powerful machine. The art of keeping up the revs. is another mighty antidote. Many riders are afraid of allowing their engines to rev., evidently being oblivious of the fact that it does a modern engine not one atom of harm to turn over at high speed, whereas konking at low speed is fatal. Tackle your hills at a brisk swing, change early and with your throttle half open so that the engine has time to pick up to low gear speed while in free position, and once in low gear do not be afraid of opening up and allowing your engine to turn over. When changing up, on the other hand, do it smartly, but close the throttle while changing, so that the high gear is not engaged on a racing engine.

Ignition too far advanced, and excessive carbon deposit which increases the compression, cause an increased tendency towards konking. Also if the compression is naturally too high this trouble is experienced in its worst form. When a sidecar is attached to an under-powered mount, therefore, it is a good plan to reduce the compression, either by placing a thicker joint ring between the crank case and the cylinder (do not forget to readjust the tappets), or by fitting a small brass ring, or several copper-asbestos washers, under the exhaust valve cap, so as to elevate it a little, as shown in the accompanying sketch.

Knocking.

Knocking is distinct from konking, in that it is not necessarily due to overloading. The knock that is to be feared is a malicious, metallic hammer, which suggests looseness somewhere; when descending a gradient with the throttle half closed and the engine practically idle it is probably at its worst, increasing with the speed to a vibrating rattle. That is the only kind of "knocking" one needs to fear—the kind that generally comes on suddenly and as a stranger to the engine, and which becomes worse as time goes on. Two-strokes do not generally develop it, even though the bearings be worn, and it must not be associated with two-stroke rattle.

There are a dozen different things which signify trouble by the appearance of a knock, and each gives forth a different sound, so that it is quite impossible to lay down any rule of thumb guidance. The chief point is that the knock to be feared leaves you in no doubt as to that fact. The best plan is to administer an overdose of oil, as temporary dryness may cause it, but if, with a smoky exhaust, it continues and becomes worse, something is wrong. Probably a big end is gone, and you will be able to feel the play on removing the cylinder, or it may be a crank case bearing. A worn gudgeon pin causes a disturbing little pink, which is difficult to distinguish from a natural piston tap unless one knows the individual machine, but the really harmful knock is usually accompanied by other sounds, which cannot fail to disturb even the merest novice.

Piston Tap.

This is a phenomenon which many of the best engines possess and always have possessed, and it is not an objectionable sound. It is a tap, rather than a knock, most noticeable when accelerating, though in some engines it is always there. The best 3½ h.p. single I ever possessed had a piston tap which made the experts stare, yet there was not an atom of wear in that engine, its revving capacities were terrifying, and it was a glutton on fast climbing. Half the letters the Editor of *The Motor Cycle* receives from anxious readers who possess a knock are incited by this healthy piston tap, which five engines in every ten possess to a more or less marked degree. Incidentally, one of the old paddle steamers which runs to-day between England and France possesses a piston tap which reminds me of my hot-stuff single, and this is the nearest approach we have to the sound—when a steam engine has water in the cylinder and requires blowing off.

Summing up, then, there is a good deal of wasted anxiety over piston tap or "pinking." The sorts that really need to be feared are those which come under the category of "konking" or "knocking."

THE MOTOR CYCLE

AVIATION SECTION

British Aviator's Magnificent Scrap. R.A.F. Officers and the Queen of Belgium.

The Late Capt. B. C. Hucks.

Capt. B. C. Hucks, who was the first British airman to loop the loop, has died from pneumonia following influenza.

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Death of a Leading French "Ace."

Lt. Coiffard, one of the leading French "Aces," who had thirty-four victories to his credit, has died as the result of wounds received in aerial combat.

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A Civil Department of Demobilisation and Resettlement.

The Government has created a Civil Department of Demobilisation and Resettlement, responsible to the Minister of Labour under a Controller-General, Sir Stephenson Kent, K.C.B.

The Department will deal with all questions affecting the re-employment and resettlement of the Navy, Army, and Air Force, and of civil war workers.

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British Airman Fights Sixty Enemies Single-handed.

The Times War Correspondent furnishes an extraordinary story of gallantry and fighting against odds of Maj. W. G. Barker, R.A.F. Being out alone, the Major saw an enemy machine above him at 21,000ft., so went up, attacked, and shot it down. Simultaneously, he found himself attacked, and before he could do anything was wounded in the right thigh. Momentarily stunned, he lost control of his machine, and when it righted he discovered that he was surrounded by about fifteen Fokkers. Against these he fought desperately. Two Germans went down out of control, and a third burst into flames before the Major was again wounded, the bullet shattering his other thigh, so that he fainted, and the machine began to spin out of control. Regaining consciousness, he found himself once more surrounded by a new pack of no fewer than a dozen enemies. He was faint and dizzy, with both legs useless, and only his hands to use, but he made up his mind to die gloriously. In an attempt to ram the nearest 'plane a bullet broke his left elbow. Having accounted for two more machines, he tried to escape to our lines, but was faced with a further pack of enemy planes. As the machines were all low down, people witnessed one of the most wonderful air fights ever seen, despite the pilot's wounds. Experts said it was the finest exhibition of brilliant "stunt" manœuvring ever witnessed. Before landing he had met some sixty enemy machines, and eight or ten at least he had sent down.

Maj. W. G. Barker is fully expected to recover from his injuries.

Carrying On after the War.

Officers in technical units of the Army are receiving official forms calling for their technical experience, and having definite questions as to their willingness to carry on in their work after peace is declared. Many, undoubtedly, who joined the Army temporarily, and have received promotion, will elect to remain in khaki.

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Cementing the Entente Cordiale.

For some days after the German evacuation the beach at Ostend was a favourite landing place for our airmen out on joy-rides—engine testing and the like. Two joy-riders on this trip about a week after the Allied occupation had an experience often paralleled in fiction but seldom realised in fact.

They had landed, and seeing ladies near their machine promptly proceeded to cement the *Entente Cordiale* by asking them to form a little tea party.

The ladies acquiesced, but suggested that they should be the hostesses, and conducted the airmen to a palatial building, where tea was promptly served.

After the meal a Belgian officer came into the room, and, to the indescribable confusion of the airmen, one of the ladies rose and said to her guests, "Allow me to present to you my husband, the King of the Belgians"!

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R.A.F. Prisoners of War Fund.

A concert, organised by R.A.F. officers and the Dunlop Rubber Co., Ltd., was recently held at Shepherd's Bush. An R.A.F. band and concert party, including several well-known professional artistes, provided the entertainment. The total proceeds, which are to be devoted to the R.A.F. Prisoners of War Fund, are expected to exceed £100.

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R.A.F. Exhibition.

The Royal Air Force Exhibition in the Agricultural Hall, London, will be opened by Lord Weir on Friday, November 15th, and will remain open till January 18th.

The public will be admitted on Mondays, Wednesdays, Thursdays, and Saturdays. Admission, 1s.

After November 15th passes will be issued to manufacturers for the benefit of designers, heads of departments, charge-hands, etc., as hitherto, on application in writing by the employers to C.T.D., Ap. D (L), Central House, Kingsway, London.

Italian aeroplanes and aeroplane workers. A section of one of the shops—scores of aeroplanes nearing completion.

ENGAGING a ZEPP

Attacking the Raiders in Darkness.

MYSTERIOUS and uncanny is the "bush telegraph" of the African jungle by which the native savage transmits news across a thousand leagues of forest in an astoundingly brief time. Not less uncanny—unless you are in the know—is the swift certainty with which information of a projected Hun air raid travels across the North Sea.

The pilots of the Umptieth Home Defence Squadron had finished mess, and were grouped in a variety of attitudes round an attendant who had just brought in a tray of cocktails. Capt. X—— was proceeding Overseas on the morrow, and everybody felt another little drink wouldn't do him any harm. The variegated beverages were being carefully sorted out amongst their intending consumers, and the Major's arm was waiting to lift and proclaim a toast. But he bit off his sentence as his eye caught the door. There stood an orderly at the salute—a peculiarly eloquent and insistent sort of salute somehow. A buff slip changed hands. The Major's eye tore down the written words. His young face hardened—a sudden hush fell on the group of waiting boys. When the Major spoke, they recognised that his "mess voice" had vanished—it was the orderly room voice that fell on their ears now.

"Eight Zepps. sighted. Heading so-and-so. At umpteen thousand feet. All Peregrine pilots, action stations at once please."

Not a cocktail was spilt. Not a cocktail was consumed. The room cleared as if by magic. The aerodrome outside began to sizzle with swift, silent activities. There was hardly any noise. Much training and previous sudden calls had oiled the wheels. No shouting. No excitement. Merely a sort of feeling in the air as if a number of men had suddenly become very busy. Then a few words in voices that were not raised by half a millimetre—"Contact?" "Suck in," and other masonic signals of the flying men's craft. At last the husky, intermittent roar of giant engines, coughing a little as they warmed to their work. The sloppy pad of heavily shod feet across the turf—heavily clad figures lumbering hastily over to the hangars. Finally a perfect tornado of sound, as the full chorus of the squadron's Peregrines rose into unison. Crescendoes and diminuendoes. Dusky, indistinct projectiles roaring up into the wind, and vanishing into the pall of blackness, their noses rimmed with stabbing flames. A sensation, rather than a vision, of giant, winged arrows streaking up steeply into the darkness overhead.

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Above, the ebon roof of night. Beneath, unseen but never forgotten by the pilots, the cruel, cold, hungry sea. Ahead, and close under one's eyes, the polished dashboard, with its formidable array of dials and gauges, their precious little needles flickering under the warm glow of the hooded bulbs. Out beyond them, the twin muzzles of the Vickers guns, each gun with a belt of live cartridges ready entered in its teeth, waiting to be drawn through and spat forth, each belt packed with potential death for a whole fleet of Zepps. Out ahead, a small, ever-changing oblong of cold, windy gloom, framed between wings and struts. Somewhere out in the inky void over which that oblong peephole roamed so restlessly, eight Zepps.—miles away out at sea, miles aloft up in the cold night, roaring landwards at seventy miles an hour on unknown courses. Were ever pilots set to keep a harder rendezvous? Of all the squadron, only two were in any sort of luck to-night: we will follow in spirit the man whom Fortune offered a chance, which was generous and was not refused.

He towered up steeply at the machine's best climbing angle. As he climbed, he smiled grimly at the old epigram about the blind man searching a dark room for a black cat which wasn't there. But he resolved to assume that the Zepps. were making for a certain objective, and to try to cut their track just

Engaging a Zepp.—

before they crossed the coast. To make height was the first essential—at great altitudes a Zepp. can climb faster than most planes, and the biggest target is easily lost on such a night. Up he swung, sweeping round and round in great spirals, his pace sinking gradually as the thin air offered less support, and his engine missed the rich oxygen of earth levels. Whilst his sensitive fingers automatically balanced the soaring machine at the correct tilts and cants, his keen eyes peered out ahead, searching the black night for a glimpse of spurting exhaust flames out to the eastward overhead, or maybe a grey shadow stealing across the faint radiance of the starless vault. Meantime, he climbed and climbed, and peered and peered.

* * * * * *

For a time the keenness of his gaze relaxed through sheer weariness, and once, or so he secretly suspects, he was almost asleep for half a second. He came back to full consciousness as his eye caught the altimeter, and told him that he had reached the level on which stealthy raiders are at home. He began to peer out ahead with a restoration of the earlier vigilance. Presently his eyes seemed to narrow and gleam. His whole body stiffened. His wrist wrenched the machine out of her spiral, and pinned that shifting oblong of forward vision on a patch of sky off which his course was just swinging. Surely, up there—just when the black seemed smeared with a kind of silveriness—a sort of grey, moving blotch . . . sst . . . yes, by ——! No mistake this time—beneath it, fore and aft, two short bars of crimson flame.

Three minutes of full throttle. Firm, deliberate feeling of the controls to steer a course to cut the Zeppelin's track. One or two final corrections, as the range narrowed. Two, three deft final touches, light as a kiss, to move the sighting ring by fractions of an inch. Then a stern, confident finger descends on the trigger lever, and like little flaming flecks of cotton-down the incendiary bullets swirl out in an angry chattering stream. They leap deliriously across the black abyss towards the flank of the giant, grey hull. So tense are all the pilot's faculties that he would swear he hears the soft thud as his bullets puncture the leviathan's taut skin. Absurd, of course. If his own engine had been silent, the open exhausts of the Zeppelin's five 300 h.p. Maybach engines would have shattered hearing for a mile around.

* * * * * *

Ah! she has seen him. Her blunt nose cants hastily upwards in a scared kind of way. She starts to climb at an incredible angle, and one feels that, by contrast with the graceful aeroplane, she resembles a timid old lady, gathering up her skirts to scuttle up the stairs of a 'bus. Too late! Watch that little flickering ribbon of flame on her flank. It begins to widen and run. It must be bigger than it looks—see how it shows up the hollows where the envelope sags over the ribs of the frame. Ah! it is leaping now. Suddenly her belly opens and disgorges mountains of flame. You can see the spidery skeleton inside shine white hot, buckle, melt, collapse.

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"By ——! he's got her," breathe the anxious watchers, waiting three miles below.

"THE £ S. D. OF FLIGHT."*

REVIEWED BY "TORQUE."

THIS provocative little book traverses no new ground, but is worth buying because it gives a comprehensive survey of the whole future of flying. The author rightly gives a financial emphasis to his title because flight must either prove remunerative or languish. So long as armaments survive, air forces must continue. So long as millionaires survive, a handful of men will enjoy expensive hobbies. But if flight is to supplement the railway, the motor, and the steamship, flight must pay. Consequently Mr. Swinton uses cost considerations as the spear point of an estimate which covers the entire field. He treats of the comparative speeds of various forms of locomotion, of their safety, of prevailing winds, of big and little aeroplanes, of flying boats, of the need of aerodromes and coast stations, of mails and freights and joy-rides and flying clubs, of every conceivable aspect of flight in times of peace. But he returns relentlessly to the keystone of the whole subject—the £ s. d. of flight.

He does not disguise the obvious weakness of his estimates. Nobody can as yet conjecture the dates at which the longer sea routes will be within flying compass on a commercial basis, or how regularly a Transatlantic air mail service could be run by, say, 1925 A.D. Nobody can say with certainty whether the urgent mails or passengers seeking accelerated transport over any given route will suffice to let the planes and pilots earn their keep. Nobody can even estimate the post-war price of petrol.

On the whole, it would seem that a close study of the singularly favourable Paris-London route leads to pessimistic conclusions, so far as the immediate future is concerned. Travellers will prefer to fly over this route on those gorgeous days which occur comparatively seldom. In doubtful weather for some years to come they will prefer the boat: and the service may find its foundation in mails and cargo. It does not necessarily follow that the long distance routes are more unfavourable For instance, the trip from London to Bombay by rail and steamer cost £51 odd in pre-war times and occupied fourteen days: by air it should take 2½ days and cost £100. Continents in which alternative means of locomotion are very dear and very slow will find that aviation pays.

Mr. Swinton prophesies a "Ford" aeroplane in the shape of a 60 h.p. two-seater, selling at £250.

If a second edition is called for, the financial chapters should be rewritten, as certain sections are not easy to follow. Regarded as a whole, the book is the most comprehensive estimate that has yet appeared, and exposes the folly of those glib prophets who consider that all the problems of aerial transportation are solved.

* By A. J. Swinton. Price 6s., 205 pages. *Aeroplane* Publishing Company Bream's Buildings, Chancery Lane, E.C.

The British Airman Seen Through French Spectacles.

Contemporary Opinions of the Work and Personnel of the R.A.F.

"POINTING out how, at the same time that the French nation was mourning the loss of Guynemeyer, the British Empire was bewailing the fact that four of its most brilliant airmen had lost their lives—McCudden, Mannock, Dallas, and Little—and how these four aces, who have just paid the penalty, accounted for 178 enemy machines," our French contemporary, *L'Auto*, opens an interesting article which gives a Frenchman's opinion of the men of the Royal Air Force and their work.

"We do not know how to sound the praises of the R.A.F. sufficiently loudly, as anonymity is the rule in the Fifth Army serving across the Channel. The British Aviation Service, which includes not only the R.A.F., but also the Air Forces of Canada and Australia, has obtained, by totally different means from those employed by our aviation corps, identical results.

"Englishmen are phlegmatic and cold, but they fight like sportsmen. Frenchmen are ardent, warlike, and often quite heedless when in danger. English aeroplanes hardly underwent any alteration for a long time, and for a period our Allies were fighting the Germans with very inferior machines. French aeroplanes were always being changed and improved, and except at the beginning of the great Verdun battle, they were always on top of their enemies. However, despite this, the English have always been early combatants of the very first order. Why? For many reasons! First, English aviators consider death in an aerial fight not as an accident, but as something quite natural, whence their exterior indifference when fate went against them, for, to use a vulgar expression, 'they are never rattled.' They thoroughly understand fighting in formation; they have not the brilliant individualism which flourishes in the majority of the French aces; but it seems that they have acquired this capability of fighting in formation through long practice in the friendly contests on the ground that football has promoted among them, which renders it necessary for the team to win and not for the individual himself to shine through a particularly brilliant try. Likewise in the air, they aim to attain victory for their squadron, and not for each individual ace, and this accounts for the large number of enemy machines brought down. The Englishman sticks to his machine for a long time, until he has arrived at the stage when he knows it from stem to stern, treating it as a veritable plaything, with the result that absolute control of the machine becomes quite automatic."

Here are a few experiences with the British which came to the writer of the article:

The Sportsmen.

"Our squadron in Artois in 1916 was close to an English aerodrome, and one afternoon we had to pay a visit to our British neighbours. It was teatime, and we were invited to join it. We had hardly sat down when a reconnaissance patrol returned from its mission. At the start it consisted of six machines, but on the return journey there were only five. The missing aeroplane had fallen in flames in the enemy lines. Tea proceeded as if nothing had happened, but the captain in charge mentioned to the mess steward to remove one of the places laid, as the man it was laid for had not returned. Not a word was spoken about the matter, and absolute calm reigned. Some hours afterwards we left, and it was not until the morrow that I learned from a mechanic that more than one comrade of the missing man had shed a tear in secret; but their sorrow was well hidden. The Englishman, through a sort of self-respect, keeps on the surface a superior indifference in the face of destiny. To obtain this result needs great force of character. Nerves and muscles must be submitted to incessant control, so as to be made to obey the orders of the will; little by little it becomes a habit, and later on a redoubtable force.

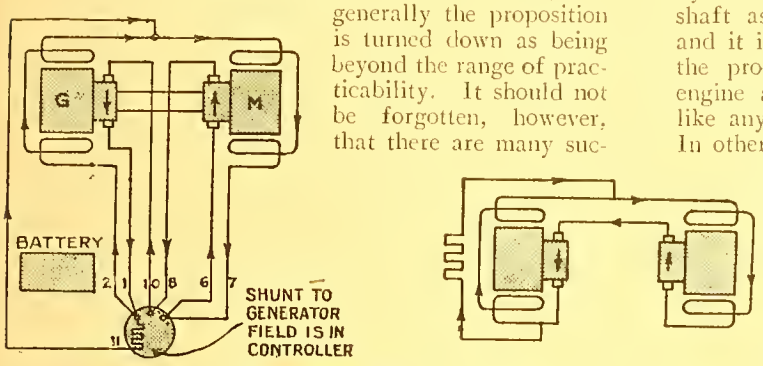
"Another day, also in Artois, there landed in one of our aerodromes an English airman, whose machine was literally riddled with bullets. Capt. Bordage, who was commanding a squadron of Maurice Farmans close to our people, received him. 'Are you wounded?' 'No, sir,' answered the Englishman. We acted as interpreter between the English aviator and the French captain. The Briton related how over Lille he had had a scrap with ten Boche machines, and some minutes afterwards with Immelmann, the famous German ace, nicknamed 'The Falcon of Flanders.' Smiling at us all the time, he told us about the fight, as he calmly lit his pipe. 'It was fine sport,' he concluded. Were we not right in mentioning above that the English fight like sportsmen? These are examples among a thousand others which show the character of English aviators."

French seaplanes about to start on a bombing expedition. The picture was taken at a French seaplane station on the Mediterranean coast.

Why not a Petrol-electric Motor Cycle?

Some Particulars of the Entz Electric Transmission as used on the Owen Magnetic Car, a Principle, it is Suggested, that offers Certain Possibilities in Connection with Motor Cycles.

WHENEVER the electric motor cycle is mentioned it is suggested as an alternative to the petrol-engined mount, with the result that all the drawbacks of the accumulator are referred to, and generally the proposition is turned down as being beyond the range of practicability. It should not be forgotten, however, that there are many successful electric cars on the market, and as the storage battery has been very much improved of late, even the electric motor cycle with accumulator equipment offers greater possibilities to-day than it did a few years ago.



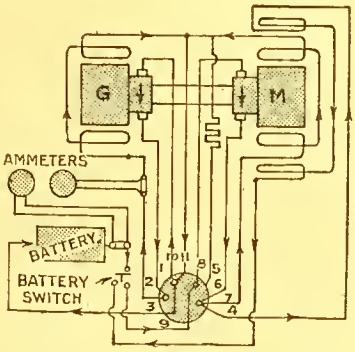
Wiring connection for sixth speed.

Probably for some years to come the weight of an accumulator equipment and the very limited range of action of such a machine will militate against this type of motor cycle being considered seriously, but there is another type of electrical transmission which apparently has not been considered in connection with the single-track machine. This is the Entz electric transmission as used on the Owen magnetic car, which has taken a front rank position on both sides of the Atlantic. In this system, excepting for a small battery for starting purposes, the accumulator plays an unimportant part. Instead of a motor supplied with current from accumulators there is an engine, generator, and motor. The conventional clutch and gear box are eliminated altogether, and at no time are the road wheels coupled inflexibly to the prime mover—that is to say, the power is magnetically transmitted.

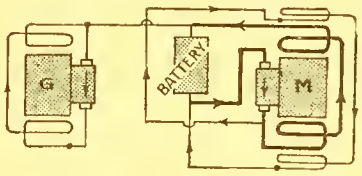
The Entz transmission on the Owen magnetic car consists of two direct-current dynamos and a drum controller. One of the dynamos has its field magnet frame directly connected to the engine crankshaft, the frame taking the place of the ordinary flywheel. This machine acts both as a clutch and a generator; its armature is mounted on a hollow shaft. The second dynamo has its armature mounted on the same hollow shaft as the first; its field magnets are stationary, and it is generally used as a motor to assist to drive the propeller-shaft, and to help the effort of the engine as transmitted through the generator, which, like any clutch, can only transmit the engine torque. In other words, without the second electrical machine the transmission is nothing more than a so-called magnetic clutch.

Almost every schoolboy knows that electricity is generated by revolving an armature in a magnetic field, *i.e.*, the waves of magnetism passing from the north and south poles of a magnet. In practice it does not matter whether the armature or magnets are rotated. If both are permitted to revolve at equal speed in the same direction no electricity is generated.

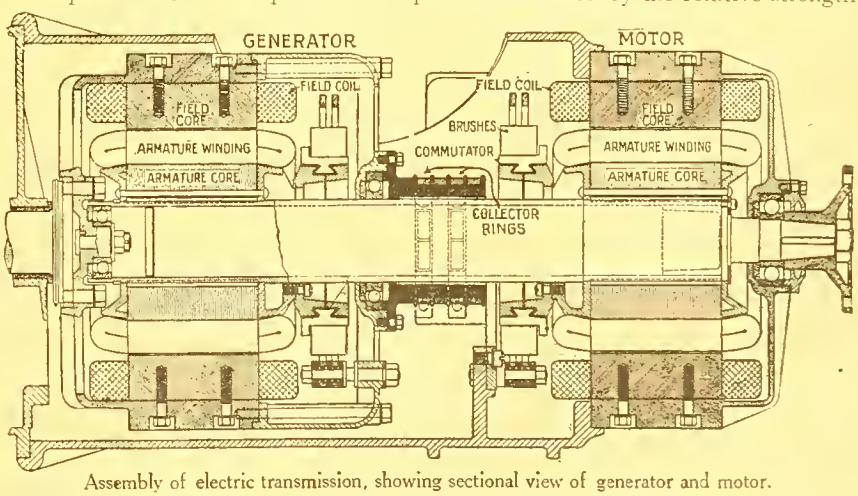
In the case of the Entz transmission, the engine revolves the magnets of the first dynamo, the armature being carried on the propeller-shaft. Assuming the car to be stationary and the engine running, it will be seen that there will be a tendency for the magnets to compel the armature to follow them. This is the elementary principle of the magnetic clutch. In the Entz system, however, the second electrical machine uses the electricity generated by the first machine when the armature is stationary or travelling at a slower speed than the magnets which are secured to the engine-shaft.



Wiring connection for first speed.



The control is accomplished by one lever which simply moves a drum controller to different positions. The gradations of speed and torque are controlled by the relative strength



Assembly of electric transmission, showing sectional view of generator and motor.

of the generator field compared to the motor field, the greater the slip between engine and propeller-shaft and the more electrical energy goes to the motor, thus producing greater torque.

The wiring is so connected that in the first control position the generator field is shunted and weakened while the motor field is at full strength. In the second position both fields are unshunted, but the motor field is still the stronger, because it is wound with more turns. In the third position the generator is unshunted. The motor field is shunted so that it is weakened compared with the generator field; it then gives less torque for a given current, but also less counter-electromotive force, and therefore less slip at the generator. In the fourth and fifth positions the motor field is gradually weakened by regulation of the controller, but the external connections are the same as shown in the third diagram. Each of these steps approaches more closely to the high speed position, where both the armature and the field of the motor are cut out of the generator circuit. The generator is used as a magnetic clutch only in the high speed position, when its armature is short-circuited; a small speed difference (or slip) between the armature and the field is necessary to establish the current in the generator windings that energises and causes the generator to act as a clutch.

Top-speed Braking Arrangements.

On power control positions other than the high speed position, the motor helps to drive the car by taking current from the generator; the slip in the generator is then greater than is needed to energise the clutch, and the current thus produced is used in the motor to give additional turning effort to the propeller-shaft. In the high speed position the motor plays no part in the transmission of power, but acts as a charging generator for the storage battery, which supplies current for the starting and lighting.

Besides the power control positions there is a neutral position in which the clutching effect is cut out but in which the motor is connected through a resistance so as to act as an electric brake. The motor then becomes a generator, taking power to drive it, thus retarding the vehicle. Another set of wires makes connections to use the generator as an engine starter; the field and armature connections are reversed so as to turn the engine forward, and the storage battery is included in the generator circuit.

The Question of Weight and Cost.

Probably the first question that will be asked by the motor cyclist will be regarding the weight. Would it be possible to produce a motor cycle with a similar transmission at approximately the same weight as one with conventional gear box and clutch?

In this connection it is interesting to know that in 1914 two cars were driven across country for over a thousand miles under precisely the same conditions. One car had the Entz transmission, the other a conventional gear box. These cars were large seven-seater vehicles, yet the Owen car using the Entz transmission weighed only forty pounds more. Forty pounds on about two tons is not a very excessive extra weight. From this it would appear that a petrol-electric motor cycle need not necessarily be much heavier than one of conventional design, while against the disadvantage of the slight extra weight, if it existed, there would be the great advantages of silence, smooth torque, absence of gear levers, an infinitely variable gear, and the absolute cleanliness of the transmission.

The petrol electric motor cycle would not differ much from the conventional machine, as the electrical unit would take the place of the gear box. It could be used either as a countershaft gear, driven and driving by chains, or on the propeller-shaft, if this type of transmission were used, while on the point of cost, probably it would cost a little more than a machine with sliding type gear box, but perhaps no more than such a machine fitted with dynamo lighting. The petrol-electric motor cycle would be equipped with lighting and starting apparatus.

THE "GOLDEN AGE" RECALLED.

Sidecarring in the Midland Counties. A study in sunshine and reflections on a perfect Autumn morning.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

SPRING FRAMES.

Sir,—We notice in the issue of *The Motor Cycle* for November 7th, on page 410, you are giving a brief review of various makes of spring frames, among which we notice one, central in position, which you call "The Brampton spring frame on a Hobart."

Our object in writing you is to inform you this is not a Brampton spring frame, but a Hobart, and the patent is held jointly by Messrs. J. Richardson and F. T. Downes, and we would ask you to be good enough kindly to correct this in your next issue. HOBART CYCLE CO., LTD.

A SUITABLE MOUNT.

Sir,—I am about to purchase a combination, and not having great experience in the motor cycling world, I should feel greatly obliged if one of your readers who has had considerable experience with British and American machines, especially high-powered ones, would be good enough to give me his advice regarding these, so that I should be able to purchase the right machine at first—one which gives the least trouble in general use. I may mention that I am a lover of powerful machines. S. BRESLER.

205, City Road, E.C.

OVER THE HILLS AND BACK AGAIN.

Sir,—I have just read with interest an article in the October 17th number of *The Motor Cycle* on "Recollections of Pre-war Trials," by a Competition Manager, and many of the incidents he mentions I can remember, especially Applecross and the "Touchwood" mascot. I was present at the burial and cairn-erection of "Touchwood," and afterwards procured from the unfortunate rider's machine a sidecar fitting which replaced one I had broken, and was disqualified in this trial for procuring this part *en route*. I am not superstitious, but it is strange that this rider, my passenger, and I should the night before all have lighted cigarettes from the one match; this was noticed by the Zenith rider, who said it did not matter as his "Touchwood" charm would nullify all ill-effects. He was wrong, however, as we all met the following day (in trouble) on Applecross, hence the burial of the "Touchwood" charm.

My passenger (now a captain in the A.S.C., M.T.) and I never light three cigarettes with one match, and when asked why, we tell this tale, but are never believed; but, thanks to your article, I have convinced one member of the mess at least. J. WALLACE MOFFET

B.E.F. (SEC.-LT., A.S.C., M.T.)

WANTED, A NON-RUSTING FINISH.

Sir,—With reference to "Ixion's" remarks *re* the above, it has often occurred to me that a solution of the above might be found in galvanising all steel parts. I do not know whether this has ever been tried, but I have never read that it has. We are all familiar with the various domestic articles treated in this way and how well they stand the weather. It might be objected that the appearance would be somewhat flashy when new, but after they had been weathered a little the colour would be something like a dove grey, which would not be at all bad.

With regard to the manufacturing side, I should imagine that wheels, frames, mudguards, carriers, etc., could very easily be treated in a built up condition, and it should come out cheaper than enamelling and plating, which requires extensive polishing. Perhaps someone in the trade will venture an opinion on the subject. I may add that I have been connected with the trade for twenty years, but have never come across any process yet that was actually weatherproof in practice. It would surely be a great boon if we could wash our machines down with water in a few minutes instead of laboriously having to clean them with rags. INTERESTED.

Birmingham.

AIR-COOLING.

Sir,—In reference to the letter signed "W. Parkinson" in your issue of September 19th, I would point out that the suggested method of cooling is covered in our patent specification, No. 9,752, 1918.

This patent refers to forcible air-cooling, and embraces several suitable methods for obtaining this.

Macedonia. G. H. DURSTON, Cpl. R.E.

LOOKING AHEAD.

Sir,—"A Rider of Many Pre-war Models" seems to be extending the scope of *The Motor Cycle* to act as efficiency adviser to the motor cycle trade, and, to use a colloquialism, trying to teach his female grandparent to "suck eggs" in the matters of Taylorism and waste prevention.

"War-time quantity production" means two things—standardisation and repetition. Does he wish the trade to adopt standardisation in its widest sense—co-operating and each concentrating on the production of specialised parts, others to be mere assemblers? Otherwise how can they adapt the war-time lessons to peace-time competitive production?

I agree that the American method of buying out might be adopted with advantage, but the British motor cycle trade has such widely varying demands—individualism is so much more prevalent—and there are not at present a sufficient number of jobbers to provide the big firms with the stuff to assemble.

In the case of the United States, the same big outputs that enable the motor cycle firms to maintain enormous establishments make it possible for the jobber to flourish on the quantity of repetition work. Once this condition obtained in England it would be all to the good by enabling us to have standardisation without crippling individuality and progress, but how is the whole industry to turn to this state at one sweep?

Possibly the present high tariffs against America will be abolished, and then the first essential of any successful effort to compete with them will be quantity production. If it is desirable, therefore, to adopt interstandardisation the matter rests with not one or two of the bigger firms, but with the industry as a whole; therefore the sooner they get together in this eventuality the better, otherwise the facilities of individual factories in the United Kingdom will not permit of production to such an extent, however well organised.

The change-over is bound to some extent to depreciate the goodwill of the erstwhile manufacturer. On the whole, until Imperial policy is more clearly defined and the Overseas markets more definitely gauged (a job for the technical press), I do not think the individual maker can advantageously alter his programme, and it is hardly necessary for your contributor to point out to the average maker (who is usually a wide-awake and hard-headed business man) the necessity for works organisation on the lines laid down by the M. of M., which has been productive of considerable financial loss in many cases. J. WATTS

THE THREE-JET BINKS CARBURETTER.

Sir,—I have been following the various letters dealing with the above carburetter with great interest, as I have had one on my Ford for about three years.

I encountered the same difficulty from the first that has been commented on by your various correspondents, namely, the mysterious "dead spot" when opening up on to the main jet, and am writing to describe the way I finally cured this defect.

After trying various jet combinations, I found that the difficulty in my case seemed to be in the second pilot jet. In other words, one jet would give too rich a mixture when first brought into action, but was apparently quite suitable when opening up on to the main jet, whilst a smaller jet was just right at the start but caused that fatal pause when opening up on to the main jet.

I then tried the smaller second pilot jet, and put a thin copper washer under the main jet so as to bring it into action a little sooner. This completely cured the trouble, and the carburetter has given me nothing but satisfaction since.

I do not say that this method would be suitable in all cases, but suggest that it might be worth trying.

W. W. CUNLIFFE.

Sir,—With reference to the letters which have appeared in *The Motor Cycle* concerning this instrument, perhaps my experiences may be of interest to someone. My machine is an 8 h.p. Zenith, fitted with a 90×77½ S.V. twin J.A.P. engine, and pulling a Millford sidecar. I fitted the Binks in May this year, and at first obtained very indifferent results, particularly on the main jet. However, by the elimination of air leaks and careful adjustment, I have obtained results which are so far satisfactory. My present jets are .0000—2—7. The first pilot .0000 I have reduced by reamering out, soldering up, and again reamering out with a very fine needle. I make a run of seven miles each way out and home, with passenger weighing 9 stone, and find that I gain an increase of 15 m.p.g. by using this instrument. The great drawback is that when adjusted for successful and economical running when the engine is warm the pilot jets are too small for easy starting from dead cold. Care and thoroughness in the elimination of air leaks into the induction system and retention of compression are the factors governing success. This is *my* experience. I have previously used a Senspray on this machine, and could easily vaporise paraffin with this carburetter when once the engine had become warmed up on petrol. The Binks does not take at all kindly to pure paraffin.

I am sure that owners of the Binks carburetters who are not satisfied with them will derive instruction, amusement, and satisfaction from continuing their careful experiments and adjustments on the lines I have followed. May I offer a word of warning against making structural alterations to the carburetter itself? J.A.C.

Burslem.

THREE-WHEELED CYCLE CARS.

Sir,—I have been much interested in the letters in your columns *re* three-wheeled cycle cars, and as I have recently had the privilege of a trial run and personal inspection of the latest model Scott three-wheeler, perhaps you will allow me to add my opinion to the discussion and give my reasons for thinking it the motor of the future for the man of moderate means.

First, as regards Mr. Morgan's statement that a two-tracked three-wheeler is considered mechanically unsound. I have had a 1913 Scott and sidecar in almost daily use for the past five years, a very large mileage having been covered over byroads which, owing to heavy timber traffic since the war, are considered impassable to motorists. In this work it has been subjected to shocks and twisting strains which, I am convinced, would have ruined any other type of vehicle, but I have never had any chassis breakage, and, so far as I can see, it is in perfect alignment. This I have put down to the system of triangulation.

Then again, I have been a Scott enthusiast since 1911, and after seven years' experience of the smooth running of a two-stroke twin the only possible alternative is a four-cylinder four-stroke.

It is impossible to trespass on your space sufficiently to give an adequate description of the many refinements of this machine, but I should like to summarise its best points as under:

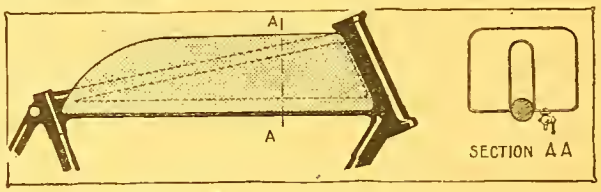
The power and sweet running of the engine, its extreme accessibility, the smooth operation of the gears, the convenience of starting the engine inside the body, and the comfort of the bell crank springing are first impressed upon one; while the enclosed shaft drive and disc wheels make one realise the joy of being able to wash it down with a hose without worrying about the chains or washing mud into the hubs, and with the readily detachable wheels one feels the puncture bogey is laid for ever.

As regards the much discussed appearance of the Scott, I can only say that, putting aside preconceived ideas of beauty borrowed from the car world, it strikes me as an extremely smart and business-like looking little turnout, and I consider that not only is the problem solved for the man who wants something better than the sidecar at little extra cost, but that it compares favourably at every point save appearance with the £300 light car *de luxe*.

I have no financial interest in the Scott. My present absorbing interest is to find out the earliest possible delivery date. ERNEST CREIGHTON.

THOSE LITTLE WORRIES.

Sir,—"Ixion" refers to scooping oil and dust from between the top tube and the tank as one of the worries for which our sons will respect us. He is quite right in putting this defect among the others which are sure to be ousted in course of time, and he will not have to wait fifteen years, or even as many months, for this particular evil to be overcome.



The saddle tank referred to by Douglas Leechman.

The absence of this dirt-harbouring crevice is one of the many good points of the saddle tank which, it will be remembered, drops into position astride the frame instead of being pushed sideways in between the top tube and tank tube.

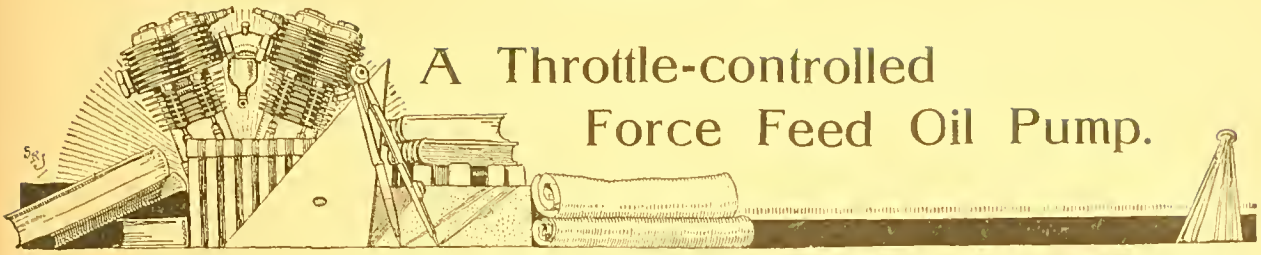
But the saddle tank has more important merits than its cleanliness. For example, the arched partition along the middle of this tank reduces the lateral surging and swaying of the petrol, and so contributes to steady running. Again, the one side of the tank forms a natural reserve compartment to the other; for, while the petrol level descends equally in both sides for the greater part of the time (the partition tapering off to a very low height at the rear), towards the end some of the liquid gets pocketed, and the drying up of the side fitted with the tap gives the usual warning. Then, simply leaning the machine over empties the pocket into the business side, and enables the rider to carry on to the next village. There the flush top may help again, as, in the absence of the obstructive top tube, the fillers can be made so large as to extend the full width of the tank if desired, and replenishment can be accomplished in record time.

Lastly, the saddle tank can have a large capacity without excessive width, and allows of the top line of the machine following any contour that may be desired. In fact, the saddle tank was devised, not for its own sake, but to secure these last two points in connection with the triangulated top frame. In that design the space is too shallow to admit a large capacity tank, and to some eyes the sloping top tube is not as attractive as the "curved back" one.

But the saddle tank gets over both those points, and is being clearly recognised as the consummation of the inclined top tube idea. Messrs. A. J. Stevens and Co., Ltd., have definitely adopted it, and, very broadmindedly realising that what is good for motor cycles and motor cycling as a whole is good for them, do not wish to keep it to themselves, but are wishful that other makers should take it up, too—the more the better.

I registered the frame design (No. 570,113) in 1910, but there are no rights on the saddle tank, I believe.

DOUGLAS LEECHMAN.

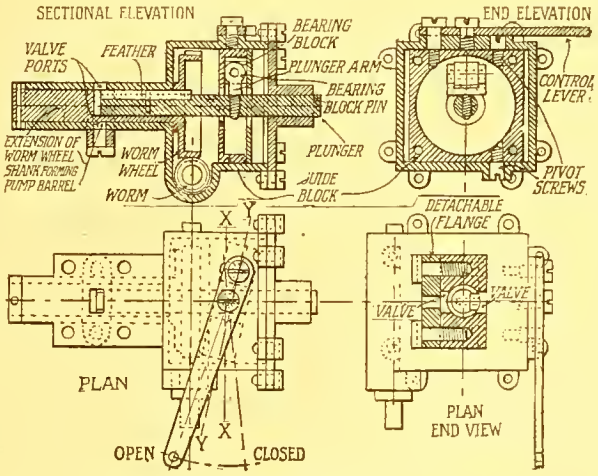


A Throttle-controlled Force Feed Oil Pump.

An Oil Pump designed to meet the Requirements of a Rider of the Luxury Machine.

MANY contributors have been harping on the necessity for some form of mechanically-operated lubrication system, and Mr. A. G. Mackay, of Avon House, Glovers Road, Small Heath, Birmingham, has designed a pump which he claims will satisfy the demands of the most fastidious rider. The main advantages claimed are compactness, durability, simplicity, and positive action throughout, as there is no spring operation involved in the working of either valves or plunger; the pump also discharges all the oil in the barrel at every stroke and at any adjustment of the stroke. The following description of the pump is in the designer's own words:

"The positive and unusual motion is given to the plunger by what, I believe, is a new departure in applied mechanics. The engine speed is, of course, reduced (about 100 to 1) by a worm and worm wheel, and this latter has an extension that forms the pump barrel. The plunger also revolves with this, a feather being pegged to the plunger and sliding in a slot cut in the sleeve-like portion of the worm wheel. The plunger also carries a short arm with a bearing block attached, which is caused to revolve within the guide block. Except for the recess the guide block is square, and in the zero position is at right angles to the plunger. This is the position it is shown at in the end elevation, but the control lever can cause it to rotate in one direction on the pivot screws. In the plan dotted lines show the guide block in the fully 'on' position, *i.e.*, moved from the centre line XX to the centre line YY.



The Mackay throttle controlled force feed oil pump.

"When the guide block is at right angles to the plunger it can impart no reciprocating motion to it, but does so in proportion as it is deflected in any degree towards the position 'YY.' When the lever is thus deflected the bearing block in its course round the inside of it is free to move independently of the plunger in two other directions in order that it may bear evenly upon the guide block throughout its course. This is provided for in the first place by the arm itself turning slightly as required on the screw that attaches it to the plunger, and secondly the movement of the bearing block itself upon its pin.

"The centre line of the pivot screws is the same distance from the centre of the plunger as is that of the bearing block and its pin, and it is because this point is chosen upon which the guide block shall pivot that causes the plunger, whatever its stroke, to return to the end of the pump barrel and discharge from it all the oil.

"The inlet and delivery valves are also of a simple character. Two oblong ports are cut in the pump casing, and these are identical, a reversal of the pump drive reversing the direction of the oil through the ports. However, in the model shown the inlet port side is provided with a flange so that it may be attached directly to the oil tank, whereas the delivery is shown with a detachable flange for receiving the oil pipe to engine or sight feed. The sleeve-like portion of the pump barrel covers these ports except at that part where the slot is cut in it, which also becomes a port with a length equal to the travel of the plunger at the moment, the feather being attached to the plunger. It will be observed that on the out-stroke the inlet port is uncovered and the delivery on the return stroke. The length of the port in proportion to the barrel circumference is such that inlet and delivery cannot be open at the same time.

"The sectional elevation shows the pump in the fully 'on' position with the plunger half-way on its outward stroke. The action of this pump is very smooth. Ball bearings could be fitted to the worm spindle, and any suitable drive from the engine arranged. The working parts are all enclosed, the worm running in an oil bath. The control lever could be operated by hand as "Chinook" demands, and as in the one I have made and fitted to my 4 h.p. combination. In this case it should be made to spring over a toothed quadrant. Or it could be coupled up with the throttle, and in this case a Bowden wire with the usual spring and adjustment nut would be fitted. Up to the present I have been unable to give the pump any tests on the road, but it seems satisfactory so far as can be ascertained." Judging by the description and illustration Mr. Mackay has added a welcome improvement to mechanical lubrication.

QUESTIONS & REPLIES

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Magneto Timing.

I am in difficulties with the U.H. magneto on a two-stroke. The contacts seem to remain too long apart, and the engine four-strokes splendidly, but will not two-stroke. There is nothing wrong with the timing, and it can be varied from the handle-bars. Can you, please, tell me (1.) How long the contact points should remain apart on a two-stroke, relative to piston travel? (2.) How long on a four-stroke? (3.) Is it possible for you to supply Signor Foresti's address, about whose flat double twin such an interesting article appeared in *The Motor Cycle?*

(1.) There is no necessary relation between the period of open points and the distance of piston travel. The time that the points remain open depends entirely on the construction of the magneto contact breaker, and on whether the magneto runs at engine speed or half engine speed. (2.) Consequently there is no essential difference between the duration on a two-stroke and on a four-stroke. We should imagine that the difficulty with your machine is not magneto trouble, but air leaks or faulty lubrication. (3.) The address that you require is G. Foresti, Bryanston Garage, 45, Crawford Place, Edgware Road, London, W.1.

Stationary Engine.

I should value your assistance and advice upon the following queries: (1.) I am fitting up an engine for stationary work which was originally a boat engine. My trouble lies in governing the speed automatically when the load is light. Would fitting an oscillating type of magneto help me with my difficulty? Kindly explain this kind of magneto, as I know nothing of it more than seeing one illustrated in an advertisement. (2.) Are the above mentioned magnetos made for twin-cylinder engines and different angles?—N.H.

(1.) With regard to fitting a governor to the engine, this should be of the centrifugal type, and should be interconnected with the throttle, and so fixed up that as the governor balls extend the throttle is closed. An oscillating type of magneto would be of no assistance at all. This type of magneto was designed when there was a difficulty in arranging for advance and retard. It is generally known that with the average magneto the maximum position is that in which the magneto gives the strongest spark, and this is usually at a point just short of full advance; therefore if the magneto is advanced or retarded beyond this point there is considerable loss in spark intensity. Now, in an oscillating magneto the whole magneto itself was advanced or retarded, and the advance or retard was therefore obtained without moving the spark from the maximum position. (2.) Not many of these magnetos were made, and these were usually for four-cylinder engines.

Running on Coal Gas.

I have fitted up my 3½ h.p. Rover motor cycle to run on coal gas, but am unable to get the engine to start. The gas bag is on the sidecar, and I have fixed a pipe to it by means of two flanges which grip the fabric. From here I have run a ⅝in. rubber tube direct to the carburetter, and have introduced the gas by means of a plate fastened over the air intake, in the centre of which is a ¼in. copper tube, over which is slipped the rubber tube. The carburetter is a B. and B. I have tried it without disturbing the carburetter, except for removing the float and float chamber cover, then with jet removed, and finally with whole of float chamber removed I know that the gas passes through the pipe all right, as I could feel it against my face when I removed the plate from the air intake. The engine is in good condition, except for a leak round the exhaust valve cap; but this did not prevent it starting on petrol, so I fail to see why it should make any difference with gas.—L.C.H.

We should be inclined to think that the reason for the engine not starting on gas is due to the fact that you have made no provision for the introduction of air. It is possible that you might get better results by removing the jet altogether and introducing the gas below the jet. We should recommend you, therefore, to try this arrangement. If this fails, try introducing the gas through a ¼in. pipe between the carburetter and engine, and fit a tap to the gas pipe.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Economisers.

A correspondent states that he did 198 m.p.g. using a White petrol economiser. I shall be extremely obliged if you can tell me of what the instrument consists and where it can be obtained; also the price. I have ridden several different makes of motor cycles and have never come anywhere within "coo-ee" of that distance even on a small 2 h.p. Singer, the best I could get being about 100 m.p.g. I am now riding a 3½ h.p. Rover, in perfect condition, and cannot get more than 80 m.p.g., although I have put in the smallest possible jet the engine will take. Any suggestions to economise petrol would be welcome, as juice out here is now 4s. a gallon.—W.V.M. (West Australia).

As far as we can ascertain White's petrol economiser is not now on the market. As regards the extraordinary mileage obtained with one of these fittings we would remind you that an even greater mileage has been obtained more than once without any such fitting, but much depends upon the tuning of the engine and the driving of the machine. You certainly ought to get much more than 80 m.p.g. with a 3½ h.p.

RECOMMENDED ROUTES.

BIRMINGHAM TO BRISTOL.—E.S.

Birmingham, Studley, Alcester, Evesham, Cheltenham, Painswick, Stroud, Nailsworth, follow the main road as far as the cross roads between Marshfield and Bristol, where turn right for the latter city. This keeps you right off the main Worcester-Bristol road.

BRENTWOOD TO WIGAN.—G.M.

Brentwood, Ongar, Harlow, Hertford, Hatfield, St. Albans, Berkhampsted, Tring, Aylesbury, Bicester, Aynho, Banbury, Ettington, Stratford-on-Avon, Alcester, Headless Cross, Bromsgrove, Kidderminster, Bridgnorth, Wellington, Whitchurch, Tarporley, Warrington, Wigan. Approximately 230 miles.

WARWICK TO WESTON-SUPER-MARE.—W.

Warwick, Stratford-on-Avon, Bidford, Evesham, Tewkesbury, Gloucester, Berkeley Road, Filton (here turn to the right at the tram terminus and cross Clifton Downs, thus avoiding Bristol traffic), Long Aston, Flax Bourton, Congresbury, Weston-super-Mare.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ——— & Co. ILIFFE & SONS Ltd., and crossed ———

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

Abingdon.

RIDER TROWARD and Co., 31, High St., Hampstead.—Abingdon King Dick, special 4h.p. competition machine, wide tank, 3 speeds, sporting sidecar, 55 gns.; ditto, 1913, 4h.p., T.T., 24 gns. [9635

A.J.S.

A.J.S. Sidecar and spare wheel.—Morton, Red House, Matlock. [9576

CROW Bros., Guildford, A.J.S. agents since 1912, always have dependable second-hand machines. [5369

A.J.S., 2-speed, £35; 4h.p. twin, £65; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [8750

A.J.S., 4h.p., 1915, about 7,000 miles, most carefully used, condition almost as new; £62.—Rev. G. H. Bibb, Ratcliffe, Park Rd., Peterborough. [9473

1915 A.J.S., 6h.p., with coachbuilt sidecar, hood, wind screen, and accessories, condition as new; any trial; £80.—Jenkins, Grahame-White Company, Hendon. [9492

1917 6h.p. A.J.S. Combination, lamps, spare wheel, valves, extra tube, hood, wind screen, luggage grid, etc., perfect condition; £110.—Box L7,661, c/o *The Motor Cycle*. [9463

Alldays.

ALLDAYS 4h.p., 3-speed, 1913-14; £35.—3, Town Field Villas, Doncaster. [9573

PEACE AT LAST!

All in sound running condition, and ready for immediate service. Why retain the services of an unreliable machine, even in these days?

RUNABOUTS AND CARS.

MORGAN, 1916, M.A.G. engine, discs	£130
MORGAN, 1914 de Luxe, water-cooled, like new	£125
MORGAN, 1914, G.P., 80 mm. tyres, dark blue	£110
MORGAN, 1916, G.P., J.A.P., discs, heliotrope	£135
MORGAN, 1915, G.P., speedometer, brown	£125
MORGAN, 1914, sporting model, grey finish	£75
SWIFT, 1914, 7-9 h.p., lamps, being repainted	£130
MORRIS-OXFORD, 10 h.p., Limousine Coupé dyna.	£325
G.W.K., 1914 just overhauled, being repainted	—
MATHIS, 1914, 7 h.p. clover leaf 3-seater	—

SIDECAR COMBINATIONS.

HENDERSON, 1914-5, 2-sp., 4-cylinder, many extras	£90
ROVER, 1917, 3½ h.p., 3-sp., c/shaft, C.B. Sidecar	£72
NORTON, late 1916, 3-speed Combination	£82
HARLEY-DAVIDSON, 1917, Swan sporting Sidecar	£128
HARLEY-DAVIDSON, 1917, 7-9 h.p., magneto model	£125
HARLEY-DAVIDSON, ditto, less accessories	£120
HARLEY-DAVIDSON, 1915, 7-9 h.p. Comb., as new	£68
ENFIELD 1914 6 h.p. Combination, 2-seater Sidecar	£60
ENFIELD, 1916, 8 h.p., 2-seater Sidecar	£82
ENFIELD 1916 6 h.p. Combination	£68
MATCHLESS, 1917, 8 h.p., M.A.G. model, hardly used	£164
MATCHLESS, 1918, 8 h.p., standard war model, new	£125
SUNBEAM, 1914, 3½ h.p., all accessories	£64
HUMBER, 1917 8 h.p., flat twin, water-cooled	£84
INDIAN, 1915, 7-9 h.p., just been overhauled	£68
A.J.S., 1916, 6 h.p., 3 speeds, detachable wheels	£100
P. & M., 1914, 3½ h.p., wicker Sidecar, as new	£60

SOLO MACHINES.

RUDGE, 3½ h.p., special Isle of Man model	£40
ENFIELD, 1912, 2¾ h.p., 2-speed, chain-drive	£20
RUDGE 1914 Multi, 3½ h.p., requires repairs	£25
DOUGLAS, 1913 (late), 2¾ h.p., 2-speed	£34
DOUGLAS, 1914, 2¾ h.p., 2-speed, nice order	£36
LEVIS 1915 2½ h.p. Popular Model	£22

LISTS GIVING FULLER PARTICULARS UPON REQUEST.

MAUDES' MOTOR MART,

100, Gt. Portland St., LONDON, W.1.

Telephone: 532 Mayfair. Telegrams: "Abdicate, Wesdo, London."

To know just how good my coveralls are for motor cyclists, get this book.

SEND A CARD

for your copy

TO

IRVINE SMITH,

Buttershaw, Bradford.

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Having a portion of our works at our disposal, we are in a position to undertake and give quick delivery of the undermentioned—

FRAME REPAIRS, etc.

ENGINE OVERHAULS.

RE-BUSHING, etc. ENAMELLING.

As manufacturers, we have every appliance and plant, all work carrying a full guarantee. We invite enquiries.

HENDERSON SIDECARS,

AERO WORKS,

FITZWILLIAM ST., SHEFFIELD.

MOTOR CYCLES FOR SALE.

Alldays.

RIDER TROWARD and Co., 31, High St., Hampstead.—Allon, 1916, 2-speed, 2-stroke; 29 gns. [9628

NEW Alldays, 2-stroke, 2-speed model; £46, complete; cash or deferred.—Harrods, Ltd., Brompton Rd., S.W.1. [9601

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8760

Ariel.

CROW Bros., Guildford, Ariel agents.—New and overhauled second-hand models in stock. [5370

1917½ Ariel Combination, 3½h.p., done 1,000 miles only, like new; £85.—Beech, 216, Alton St., Crewe. [X9703

3½h.p. 1917 3-speed Ariel and coachbuilt sidecar; cost £96, with accessories, scarcely used; accept £75.—Bates, Quarry Cottage, Guildford. [9469

ARIEL 5-6h.p. Twin, 3-speed countershaft, speedometer, lamp, horn, cane sidecar, excellent condition; £60.—Creasey, Mental Hospital, Talgarth, Brecon-shire. [X9701

Auto-Wheels.

TWO Auto-Wheels, £7; one good condition, other complete for spares.—Salway, Nascott, Newbury. [X9403

TWO Auto-Wheels, with attachment for Dingwall-Witham invalid chair, new 1917, one unused, other in perfect condition; offers.—Capt. Harvey, Holmwood, Thorpe, Norwich. [X9688

Bat.

BAT (less power unit) and Gloria sidecar, stove enamelled, Bosch mag., P. and M. gear; offers.—Lieut. St. John, Grantley Grange, Ripon. [X9634

Bradbury.

1912 Bradbury, single speed model; £20.—Cross, Effingham Sq., Rotherham. [X9685

RIDER TROWARD and Co., 31, High St., Hampstead.—Bradbury, 1913, 4h.p., 2-speed, clutch, re-enamelled; 29 gns. [9629

1914 Bradbury Combination, 4h.p., coachbuilt sidecar, 3-speed gear, foot clutch, Bosch, heavy Dunlop, excellent condition, not ridden since 1916; 35 gns.—Hopps, 16, Oxford Rd., Ealing, W.5. [9560

Brown.

2¾h.p. Brown, mag., B. and B., Palmers; offers; must sell.—30, Pelly Rd., Plaistow. [9558

Brough.

3½h.p. Brough Flat Twin, 1916, 2 speeds, T.T., speedometer, electric; owned and ridden by Mr. Geo. Brough; £55.—Herring, Market, Lincoln. [X9617

B.S.A.

B.S.A.—Several combinations in stock, 1914, 1916, and 1917.—Service Co., 292, High Holborn, London, W.C.1. [9655

1916 B.S.A., 4½h.p., 3-speed gear, all-chain drive, and good roomy coach sidecar, nice condition; £60; exchange.—136, Lavenham Rd., Southfields, S.W.18. [9603

B.S.A., 3-speed, clutch, kick start, chain-cum-belt, speedometer, Lucas horn, large P. and H. head lamp, spare parts, practically new Dunlop tyres, plating and enamel work in good condition; £50; can be seen by appointment on Saturday or Sunday afternoon.—Apply, 77, Church Hill, Walthamstow. [9551

Calthorpe.

2¾h.p. Calthorpe-Jap, 2-speed model, 1916; £27/10.—Wunchope's, 9, Shoe Lane, London. [9610

CALTHORPE, 2½h.p., 2-speed, free engine, 1914 model; 17 gns.—7, Coldharbour Place, Camberwell, S.E. [9608

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

CALTHORPE, 1915, 2-speed, 2-stroke, in good condition, P. and H. lamps, and speedometer; seen at Thames Ditton; £30.—Box L7,682, c/o *The Motor Cycle*. [9538

CALTHORPE-J.A.P., 2¾h.p., 2-speed, clutch, perfect condition, not used 2 years, complete, lamp set; £25, close offer.—Celtic Works, East Hill, Wandsworth. [9586

RIDER TROWARD and Co., 31, High St., Hampstead.—Calthorpe-Jap, new 4-5h.p. twin combination, immediate delivery without permit, £80; Calthorpe-Jap, 2½h.p., 2-speed, £48, immediate delivery; Calthorpe-Jap, 1915, 2½h.p., 2-speed, 25 gns; Calthorpe 2-stroke, 2½h.p., 2-speed, 1916, 24 gns. [9631

MOTOR CYCLES FOR SALE.

Campion.

CAMPION-J.A.P. Late 1913 6h.p. Coach Combination, 2-speed countershaft, cork clutch, handle start, chain transmission, with shock absorber, electric lighting, little used, good order; £50.—12, Swain Rd., Thornton Heath. [9504

Chater-Lea.

CHATER-LEA, 2¾h.p., 2-stroke, 2-speed, F.E., lamps etc., mudshield, spare tank, fitted paraffin, splendid condition; £20/10, or nearest.—129, Grove Green Rd., Leytonstone. [9581

Chater-Lea-Jap.

8h.p. Chater-Lea-Jap and sidecar, 3-speed, lamps, etc., fine lot; £35.—Frisco, Charlton Rd., Shepperton Middlesex. [9464

Chase.

RIDER TROWARD and Co., 31, High St., Hampstead.—Chase-Jap, 1915, 6-8h.p., Jardine 2-speed, hand clutch, smart T.T. machine; 45 gns. [9637

Clyno.

2½h.p. Clyno, 1914, 2-stroke, 2-speed model; £20.—Wauchope's, 9, Shoe Lane, London. [9611

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London. [8752

RIDER TROWARD and Co., 31, High St., Hampstead.—Clyno, 1915, 2-speed, clutch, 2-stroke; 25 gns. [9630

CLYNO Combination, 6h.p., powerful twin, countershaft gears, kick start; owner must sell immediately; bargain, £38; trial any time.—1, Gunnersbury Lane, Acton. [9555

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; ditto, new single speed, £34; ditto, 2-speed countershaft, £41; E.P. or exchange.—Service Co., 292, High Holborn, London. [8741

Coventry Eagle.

COVENTRY Eagle, new 2-speed countershaft, hand controlled, £44.—Service Co., 292, High Holborn, London. [8753

Douglas.

1916 Douglas, 2¾h.p., 2-speed, lamps and horn; £50.—Below.

1915 Douglas, 2¾h.p., 2-speed; £45.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

DOUGLAS, 1915, 2 speeds, perfect condition; £42.—619, Garratt Lane, Earlsfield. [9540

DOUGLAS.—Write us your requirements; either new machines or second-hand.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS Motors.—Send your name for waiting list now to Gibb, Douglas Expert, Gloucester. 'Phone: 852. [4749

1914 Douglas, 2 speeds, kick starter, lamps, etc., wants slight repairs; £27.—Cross, Agent, Rotherham. [X9684

DOUGLAS, 2¾h.p., single speed, running order; exchange or sell £12/10.—3, Didsbury Rd., Stockport. [X9513

DOUGLAS, 1914, 2¾h.p., 2-speed, K.S., T.T., good condition; £34.—Stanley, Wey Hill, Haslemere, Surrey. [X9653

DOUGLAS, 1914, 2-speed, complete with tools and horn, first-class condition; £35.—128, Staines Rd., Twickenham. [9481

2¾h.p. Douglas, 1913, 2-speed, clutch model, footboards; £23.—Particulars, Turner, Stanhope Av., West Hartlepool. [X9510

2¾h.p. Douglas, 2-speed, 1914 T.T., £35; another, Model U, 2-speed, 1914, £32/10.—Wauchope's, 9, Shoe Lane, London. [9616

DOUGLAS, 2¾h.p., 2-speed, free engine clutch, lamps, horn, etc., tip-top condition throughout; any trial; £32/10.—Parker's, Bradshawgate, Bolton. [X9518

RIDER TROWARD and Co., 31, High St., Hampstead.—Douglas, 1914, 2-speed, practically as new, 38 gns.; Douglas, 1914, 2-speed, 34 gns. [9632

DOUGLAS, 1914, 2-speed, complete with lamps, horn, and knee-grips, 36 gns.; 1916 ditto, 50 gns.; lady's ditto, £29; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [8739

DOUGLAS, 1915 (Aug.), 2¾h.p., 2-speed, W.D. model, oversize tyres, lamp set, Stewart horn, splendid mechanical condition; £38.—Bayliss, 239, Walsall Rd., Darlaston, S. Staffs. [9550

DOUGLAS, 1916, 2¾h.p., T.T., 2-speed, mileage 3,000, lamps, horn, knee-grips, long exhaust; £48, or exchange higher power, cash adjustment.—Lt. Disbey, R.A.F., Rossie, Kingston Hill, Surrey. [9519

DOUGLASES and other lightweights, 7-9h.p. Red Indian and sidecar outfit, Clynos, Bradburys, Humbers, Rovers, Rexes, all with sidecar, to clear.—Parish's Motor Exchange, Preston. 'Phone: 113. [X9523

DOUGLAS, modern, 2-speed, lamps, semi T.T. bars, speedometer, all accessories, spares, tools, new heavy tyre on rear, perfect throughout; £35, near offer.—Bird, 11, Foundry St., Northampton. [9500

DOUGLAS, 2¾h.p., 1913, little used, just re-enamelled, brand new spare plugs, valves, springs, pistons, rings, complete set tools and boxes, accumulator set for lamps; reason selling, owner in navy; cash £40.—1, Manchester Rd., Thornton Heath. [9483

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LAMB'S

BUY NOW, AND BE IN TIME.

MOTOR CYCLE STOCK.

NEW MACHINES.

HARLEY-DAVIDSON, elec. model, 1917, Combination, lamp, horn, 3-sp., kick-start, Harley S/c.
ROYAL RUBY, J.A.P. 2¾ h.p., 2-speed, countershaft gear adjust. footboards, semi-T.T. bars.
NEW HUDSON 1917 Combination, 4 h.p., countershaft gear, fawn finish, Dunlop tyres.
ROVER 1917 Combination, 3½ h.p., kick-starter.
CALTHORPE, 1917, J.A.P., 2-sp. gear, s.-T.T. bars.
2 **ALLDAYS ALLONS,** 1917, single-speed, 2-stroke.

SECOND-HAND MACHINES.

HARLEY-DAVIDSON, 1916, 7-9 h.p., electric equipment, Goodyear tyres, Model E Sidecar.
HARLEY-DAVIDSON 1915 7-9 h.p. Combination, magneto model, F.R.S. lamps, Dunlop rear tyre, Wood Milne front, Phœnix Sidecar.
HARLEY-DAVIDSON 1915 Comb., elec. model.
ENFIELD, 1917, 6 h.p., hood, screeo, Lucas 70/- lamp set, Smith speedometer, Lucas horn, original Palmer tyres still on.
2 **ENFIELDS,** 1916-17, 6 h.p., electric mode's, 2-speed, Lucas horn Cowey speedometer.
ENFIELD 1916 Combination, Smith speedometer, Lucas lamps, horn, Palmer front tyre, Dunlop rear hood, screen.
ARIEL 1916, 3½ h.p., 3-sp., c/shaft gear, kick-st., Stewart speedometer, Lucas horn, Ariel S/car, Lucas head and tail lamps, patent spring seat.
AR EL 3½ h.p. 1917 Comb., lamps and horn, as new.
A S. 1915 4 h.p. Combination, Miller lamp set, Watford speedometer, 3-speed, kick-starter, hand clutch, all-chain drive, glass screen.
A.J.S. late 1914 6 h.p. Combination, hood, glass screen, 3-speed kick-starter, all-chain drive, magneto, mudguard shield, Cowey speedometer, Miller lamps, horn, grid.
ALTHORPE, 1915, 2¾ h.p., Dunlop tyres, Miller lamps, Enfield 2-speed gear, leather belt condition good.
ALLDAYS ALLON, 1916, 2½ h.p., single-speed, good order, no accessories.
ALLDAYS ALLON, 1916, single-speed.
ALLDAYS ALLON, 2-sp., hand clutch, in good order
ALLDAYS ALLON, 1916, with lamps.
B.S.A., 1916, all-chain drive, Canoelet S/car, storm apron, head, sidecar, & tail lamps, mech. horn.
DOUGLAS, 1914, 2¾ h.p., F.R.S lamp set, horn, condition good.
DOUGLAS, 1912, 2¾ h.p., single-speed, Hutchinson rear tyres, Dunlop front, horn.
NEW HUDSON 1913 Combination, 3-speed gear, lamps, and horn.
JAMES 1916 Combination, 4½ h.p., 3-speed, all-chain drive, F.R.S. tail lamp, Miller head lamp, torpedo Sidecar, apron.
JAMES, 1913, approx. 4½ h.p., clutch model, T.T. bars, head lamp, Lucas horn.
JAMES 1915 4½ h.p. Comb., complete with access.
TRIUMPH, 1913-14, 3-sp., Palmer tyres, New Phœnix Sidecar, P. & H. lamp, pedal start, 3½ h.p.

SIDECARS.

HARLEY-DAVIDSON, 1917, olive finish.
WATSONIAN (2), coachbuilt, green finish, underslung £10/18/6
PHŒNIX, new, with hood and screen, green finish, underslung £19 19
CANOELET Pattern, Millford chassis ... £7 10
CANOELET Pattern, Phœnix, underslung £8 10
ENFIELD £12 10
RUDGE, underslung chassis £10 10
Wicker Sidecar, cigar-shaped £6 10

LAMB'S,

151, High St., Walthamstow, E.17

'Phone: Walthamstow 169.

50, High Road, Wood Green, N.22

'Phone: Hornsey 1956.

(Only Depot in this district.)

Hours 9 to 8. Thursdays 1 p.m.

MOTOR CYCLES FOR SALE.

Enfield.

2¼h.p. 1916 Enfield, 2-stroke, 2 speeds; £38.—Hering, Market, Lincoln. [X961

1916 Enfield Combination, complete, lamps, horn numbers, etc.; £72.—Cross, Jeweller, Rotherhau [X968

3h.p. 1914 Twin Enfield, good condition, perfect running order; £28/10.—6, Eridge Rd., Bedford Park W.4. [955

3h.p. Royal Enfield, 1914 model 30 gns.; T.T. bars accessories included.—Wauchope's, 9, Shoe Lane London. [961

1916 Enfield Combination, done about 500 miles, a new, less sidecar body; £80.—113, Blair St Poplar, London. [956

1916 6h.p. Enfield Combination, dynamo lighting excellent condition, used 6 months only; £90.—436, Whitehorse Rd., Thornton Heath, S.E. [956

1916 6h.p. Enfield Combination, complete with hood screen, horn, Lucas dynamo lighting set; £100.—Terry, Gloucester St., Faringdon, Berks. [948

ENFIELD Combination, 6h.p., in excellent running order, late model, complete with lamps and accessories; £75.—19, Fairfield South, Kingston. [958

RIDER TROWARD and Co., 31, High St., Hampstead.—Enfield, 1916, 3h.p., 2-speed, clutch, kick start, 39 gns.; Enfield, 1913, 2¾h.p., 2-speed, clutch 23 gns. [963

6h.p. 2-cyl. Motor Cycle, Royal Enfield and sidecar tyres and machine in excellent order; for sale owing to death of owner.—Apply, A.W.S.A., 28, Sackville St., W.1. [946

3h.p. Enfield, 1917, kick starter, mileage under 250, lamps, mechanical horn, a new machine; £50, or exchange with cash for A.J.S. or Enfield combination.—Cromie, General Hospital, Bristol. [X9650

ENFIELD 6h.p. Combination, 1917 model, complete with lamps, horn, etc., tip-top condition throughout, £85; also ditto, 1915 model, new tyres all round, lamps, horn, etc., 70 gns.—Parker's, Bradshawgate, Bolton. [X9519

ENFIELD Motor Cycle 6h.p. (late 1915) Combination for sale, perfect condition, Lucas dynamo lighting set, speedometer, horn, hood, etc., many new spare parts; price £90.—Apply, H. Blaiberg, Lostwithiel, Cornwall. [9580

Excelsior.

2¾h.p. Excelsior, 2-stroke, 1915, 2-speed, clutch, all-chain drive, tyres and mechanical condition sound; bargain, £30.—S. Dent, Stoke Gifford, near Bristol. [X9693

AMERICAN Excelsior, 1916, 7-9h.p., 3-speed, kick start, dynamo lighting, speedometer, perfect condition; £45.—W. H. Pike, 102a, Church St., Chelsea, S.W. 'Phone: 137 Kensington. [9503

1915 British Excelsior, 2¾h.p., 2-stroke, 2-speed, clutch, perfect running order, and new condition, not ridden for 18 months; £22, bargain.—Jones, Little Llangovan, Dingestow, Monmouth. [X9647

F.N.

F.N., 2½h.p., 2-speed, mag., good tyres, etc.; must be sold, or exchange; £10.—60, Stormont Rd., Lavender Hill, London, S.W. [9493

RIDER TROWARD and Co., 31, High St., Hampstead.—F.N., 1913, 5-6h.p., 2-speed, clutch, 28 gns.; F.N., single-speed, 4 cyls., 13 gns. [9634

Grandex.

RIDER TROWARD and Co., 31, High St., Hampstead.—Grandex-Precision, 1913, 3½h.p., 2-speed, clutch; 22 gns. [9638

Harley-Davidson.

HARLEY-DAVIDSON 1915 and 1917 Combinations in stock.—Service Co., 292, High Holborn, London, W.C.1. [9656

HARLEY-DAVIDSON, latest standard model, with special Harley Montgomery sidecar; £135.—Parker's, Bradshawgate, Bolton. [X9516

1917 Harley-Davidson Combination, electric model, only ridden a few miles; £120.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

RIDER TROWARD and Co., 31, High St., Hampstead.—Harley-Davidson, 7-9h.p., 3-speed, dynamo lighting combination, 1915 model, 65 gns.; Harley-Davidson, 1915, 7-9h.p., T.T., 3-speed, clutch, kick-start, dynamo lighting, just overhauled and re-enamelled khaki, disc wheels, 69 gns. [9640

1916 Harley-Davidson, Montgomery sidecar, Bosch mag., tyres all new, new chains, Lucas head lamp, H.H. sidecar lamp, electric, gas rear, spares, chains, valves, new ring, in good condition; £80, or exchange for Enfield combination same date and value.—Langley, 3, Worthington St., Dover. [X9508

Humber.

2¼h.p. 1911 2-speed Humber, mechanically perfect, good tyres and belt; £25; exchange.—1, Grosvenor Rd., Rugby. [X9692

RIDER TROWARD and Co., 31, High St., Hampstead.—Humber, 1913, 3½h.p., 2-speed, clutch, handle-start, 27 gns.; ditto, 1912, 23 gns.; ditto, 1911, 19 gns.; Humber, 1914, 3½h.p., 3-speed, clutch, kick-start, 29 gns.; Humber, 1918, 3½h.p., flat twin, 3-speed, 69 gns.; 6h.p. Humber, 1918, flat twin, 3-speed, water-cooled, 85 gns. [9639

MOTOR CYCLES FOR SALE.

Indian.

1915-16 Indian, 5-6h.p., 3-speed, kick starter, as new; 59 gns.—Miss Wheatley, 5, Greville St., Hatton Garden. [9564

1916 Indian 7-9h.p. Powerplus, sporting combination, good condition, just overhauled, lamps, and few spare parts, etc.; 72 gns.—Write, 1, Ellasdale Rd., Bognor. [X9616

7-9h.p. Indian, 1916 Powerplus model, 3-speed gear, clutch and kick-starter, very superior machine, but little used; 70 gns.—Wauchope's, 9, Shoe Lane, London. [9613

1916 Powerplus Indian Combination, electrically equipped throughout, hood, screen, 3 lamps, in perfectly new condition; £110.—Apply, Hay, 102, Murray Rd., Rugby. [X9675

INDIAN, 7h.p., 1913, owner in France, 3-speed, clutch, kick starter, handsome sidecar, like new, spares, tools, lamps; a bargain. £50.—Box L7,664, c/o *The Motor Cycle*. [9490

RIDER TROWARD and Co., 31, High St., Hampstead.—Indian 1916 Powerplus, 7-9h.p., 3-speed, absolutely as new, 72 gns.; Indian, 1915, 7-9h.p., T.T., clutch, 39 gns.; Indian, 1912, 3½h.p., single-cyl., 19 gns. [9641

WHAT Offers?—1915 Model C. Indian and Swan sidecar, 3-speed, speedometer, horn, and lamp (electric), engine in perfect order; seen any time.—Read, 8, Northumberland Way, Northumberland Heath, Erith. [9571

30 GNS., no offers.—Indian 7-9h.p. 1915-16 Powerplus combination, Lucas head light, electric horn, speedometer, in absolutely new condition, paint and plating not scratched; seen any time.—Gill, Wargrave, Carlestown, Lancs. [9482

INDIAN Combination, late 1914, 7-9h.p., 2-speed, clutch, kick starter, coachbuilt sidecar, speedometer, tools, etc., splendid condition, little used; complete £60.—Lieut. Shaw, R.E., 1, Old Ford Rd., Bethnal Green, London. [9495

James.

1916 James, 4¼h.p., 3 speeds, clutch, splendid condition; £50.—16, York St., Dover. [9508

3½h.p. James, 1914-15, kick start, clutch, 2-speed, in splendid condition; for sale, or exchange for more powerful James.—Marks, Bower Hinton, Martock. [X9649

RIDER TROWARD and Co., 31, High St., Hampstead.—James; immediate delivery new 5-6h.p. and 4½h.p. combinations; James 1914 canoelet combination, 4½h.p., 3-speed, 49 gns. [9642

JAMES, 4¼h.p., Sept., 1915, 3-speed countershaft gears, all-chain drive, splendid condition, speedometer, only done 2,800, not used last 18 months; 47 gns.—Rose's Garage, Uxbridge. [9462

4h.p. 1914 James Combination, splendid condition throughout, 3-speed countershaft gear, kick starter and free engine, ready for the road. £57/10; also another 1913 combination, £47/10.—Wauchope's, 9, Shoe Lane, London. [9620

J.A.P.

J.A.P. 10h.p. Big Twin, single speed, overhead valves, large adjustable pulley, fast and powerful mount; £45.—Wauchope's, 9, Shoe Lane, London. [9621

Levis.

LEVIS, 1915 model, 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

2½h.p. Levis, 2-stroke, 2-speed model, 1914 machine; £25.—Wauchope's, 9, Shoe Lane, London. [9622

LEVIS, 1917 model, new machine, slightly shop-soiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St., Ledbury. [X7263

Lincoln-Elk.

1913 Lincoln-Elk, 3½h.p., variable pulley, Bosch, B. and B., canoelet sidecar; £25; would separate.—Rogers, 23, High St., Bromley, Kent. [9583

Matchless.

THE Most Luxurious Outfit on the road.

8h.p. Matchless Combination, 3-speed, specially sprung sidecar with spring wheel, screen, Lucas dynamo lighting, electric horn, finished grey, exactly as new, light car tyres; £150.—H. Watterman, 23, Foubert's Place, Regent St., London, W.1. [9579

1917 Matchless Combination, 8h.p. M.A.G., spare wheel, electric lights, horn, screen; £120.—Below.

WE Can Give Immediate Delivery from stock of the new W.O. Model Matchless combination, spare wheel; £125.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0552

RIDER TROWARD and Co., 31, High St., Hampstead.—Matchless, 1914, 6h.p., T.T., 2-speed; 38 gns. [9643

MATCHLESS, 6-8h.p., Montgomery sidecar chassis, suit tradesman; £35.—619, Garratt Lane, Earlsfield, S.W.18. [9542

1914 Matchless Combination, 6h.p., perfect running order; 60 gns.—Miss Wheatley, 5, Greville St., Hatton Garden. [9565

MATCHLESS War Model Combinations, with spare wheel complete; delivery from stock.—Parker's, Bradshawgate, Bolton. [X9515

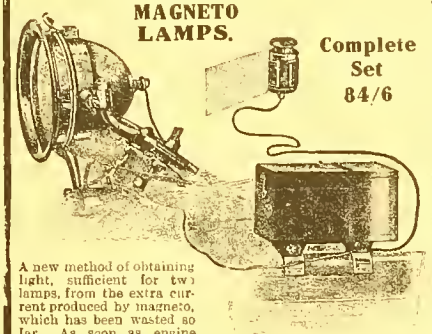
MATCHLESS 1916 7-9h.p. M.A.G. Combination, complete lighting set, ready for use; £76.—51, Maplethorpe Rd., Thornton Heath, S.E. [9517

F.R.S. ELECTRIC

Sidecar sets, complete, as above 143/-

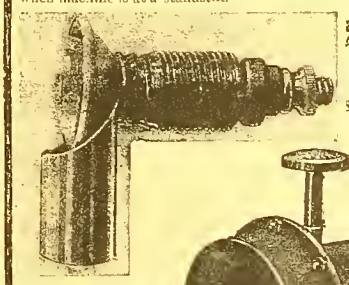
Lamps only, with handlebar fittings 42/-

MAGNETO LAMPS.



Complete Set 84/6

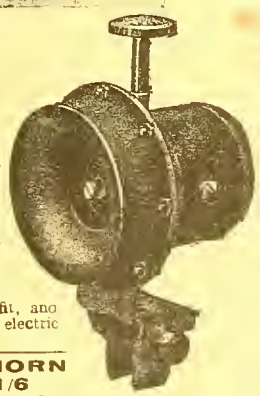
A new method of obtaining light, sufficient for two lamps, from the extra current produced by magneto, which has been wasted so far. As soon as engine starts the lamps light. Perfectly simple and foolproof. No trouble in future to get your lamps lit. An accumulator is fitted into box for use when machine is at a standstill.



ELECTRIC ADAPTER.

Price 4/9 each.

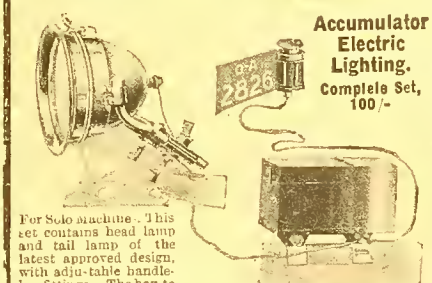
Spare Bulbs 2/- each.



This is a small fitting to enable owners of gas lamps fitted with burners of the Rom type (round stem) to make their lamps into electric.

The "adapter" fits over the existing burner with a tight fit, and is connected to an electric wire and battery.

BRITISH HORN Price 21/6



Accumulator Electric Lighting.

Complete Set, 100/-

For Solo Machine.—This set contains head lamp and tail lamp of the latest approved design, with adjustable handlebar fittings. The box to fit on the top tube contains a 4-volt accumulator and a switch, giving sufficient light for the two lamps for approx. 10 hours at one charge. It, without donbt, fills a long-felt want for solo machine lighting.

F.R.S. LAMPS, "BEAM" Works, Pershore Street, BIRMINGHAM.

MOTOR CYCLES FOR SALE.

Matchless

MATCHLESS War Model Combination, with spare wheel and tyre; £125; trade enquiry entertained; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [9345

1918 Matchless Combination, complete spare wheel, interchangeable, run 20 miles only, property of officer ordered abroad; accept £117.—Short, 485, Upper Richmond Rd., East Sheen. [9290

MATCHLESS 1918 War Model Combination, with spare wheel and tyre, slightly soiled; reduced to £119; seen any time.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

MATCHLESS.—Early deliveries of 8h.p. J.A.P. war model combination, spare wheel; £125; exchanges arranged. Now booking post-war deliveries.—Manders', 100, Gt. Portland St., London, W.1 [7737

MATCHLESS, absolutely new combination, from stock, £125; also nearly new M.A.G. model, all lamps, speedometer, horn, Palmer cord tyres, hood and screen, spare wheel, a splendid outfit, £145; extended payments or exchange.—Service Co., 292, High Holborn, London. [8733

1913 Matchless Special T.T., 6h.p. J.A.P., 2-speed, twin belt, Binks, Enk, spring pillar, speedometer, fitted new pistons, rebushed throughout, very fast, perfect order and appearance, spare piston, tyre, tube, valves; expert examination; not used 2½ years; £48.—Lieut. Baird, c/o Lake, Waters St., Bulford. [9545

Minerva.

MINERVA, 3h.p., good running condition; quick sale necessary, urgent reasons; £10, near offer.—Taylor, 142, Victoria Drive, Eastbourne. [9486

Motosacoche.

MOTOSACOCHE (new), 2½h.p., perfect, variable, F.E., Bosch; £23, offers; 1914 Triumph or Douglas wanted.—22, Edith Rd., South Norwood. [9554

New Hudson.

3½h.p. 1914 New Hudson, 3-speed gear model, smart and reliable; 30 gns.—Wauchope's, 9, Shoe Lane, London. [9623

New Imperial.

CROW Bros., Guildford.—New Imperial, all models, new and second-hand, in stock [5371

1916 2¾h.p. New Imperial-Jap, heavy tyres, good accessories; view by appointment; £22/10, or nearest offer.—J. Hayward, 2, Tresco Rd., Peckham. [9607

NEW Imperial-Jap, 1916, 2-speed model, all best accessories included, £35; ideal lightweight, small petrol consumption, £35.—Wauchope's, 9, Shoe Lane, London. [9624

8h.p. 1918 New Imperial-Jap Combination (new), War Office model, 3-speed countershaft, clutch and kick-starter; 95 gns.—Wauchope's, 9, Shoe Lane, London. [9614

NEW Imperial Motor Cycles.—2-speed, standard, and lady's models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0956

Norton.

NORTON, T.T., 1917 model, in excellent condition; £60.—Plastow, Grimsby. [9457

NORTON, latest Big 4, 3-speed, all chain; £82.—Parker's, Bradshawgate, Bolton. [X9517

NORTON Big 4, coachbuilt sidecar, apron, wind screen, just overhauled, perfect running order, spares; £45.—C. Fisher, Temple Grafton, Alcester. [X9632

N.S.U.

RIDER TROWARD and Co., 31, High St., Hampstead.—N.S.U., 1914, T.T., 3½h.p., o.h.v., red finish, 22 gns.; N.S.U., 1913, 3h.p., 2-speed, clutch, 21 gns. [9644

O.K.

O.K.'s, new and second-hand, in stock from 20 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London. [8754

P. and M.

1915 P. and M. and coachbuilt sidecar, good as new; accept £65.—Bates, Quarry Cottage, Guildford. [9470

Precision.

RIDER TROWARD and Co., 31, High St., Hampstead.—Torpedo-Precision, 1916, 4h.p., 3-speed countershaft; 45 gns. [9648

RIDER TROWARD and Co., 31, High St., Hampstead.—Precision, 1914, 4h.p., 2-speed, clutch; 24 gns. [9647

PRECISION, 3½h.p., single geared, done 800 miles, Kempshall tyres; £32; also new motor cycle frame, wants engine, tyres, £8.—25, Selwyn Rd., Edgbaston, Birmingham. [X9630

Premier.

PREMIER.—Several models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9657

RIDER TROWARD and Co., 31, High St., Hampstead.—Premier, 1914, 3½h.p., 3-speed combination, 37 gns.; Premier, 1914, 3½h.p., 2-speed countershaft, 29 gns.; Premier, 1913, 2½h.p., clutch, 22 gns. [9645

Quadrant.

RIDER TROWARD and Co., 31, High St., Hampstead.—Quadrant, 1914, 4h.p., 2-speed, clutch, re-enamelled; 29 gns. [9646

MOTOR CYCLES FOR SALE.

Quadrant.

QUADRANT, 4½h.p., 1913, 3-speed hub, complete with sidecar, hood, screen, and apron, £35; machine only, £25; E.P., or exchange.—Service Co., 292, High Holborn, London, W.C.1. [8734

Rex.

REX and Sidecar, 10 gns.; also a twin and sidecar, 20 gns.—Wauchope's, 9, Shoe Lane, London. [9617

Rover.

RIDER TROWARD and Co., 31, High St., Hampstead.—Rover, 1914, 3½h.p., 3-speed, little used; 36 gns. [9649

ROVER, 1914, 3½h.p., Stormey-Archer 3-speed, clutch, lamps, complete; £35 cash.—W. Thorley, Dayhills, Hilderstone, Stone, Staffs. [X9652

Rudge.

1915 Rudge Multi, 3½h.p., free engine, sound condition mechanically, and appearance excellent; £26.—W. Shelton, Ingleton, Yorks. [X9662

RUDGE, 3½h.p., clutch model, good condition throughout, not used last two years; £22.—Rose's Garage, Uxbridge. [9461

3½h.p. Rudge Multi, lamps, exhaust whistle, etc., in good condition; bargain, £30.—136, Lavenham Rd., Southfields, S.W.18. [9604

1912 Rudge, 3½h.p., free engine model, Ruthardt mag., Brown and Barlow carburetter, lamps, hooter, and accessories; price £50, or nearest, in good condition; owner killed.—Apply, Sherratt, 13, Hawthorne Rd., Hornsey, N.8. [9344

RUDGE Multi, Brooklands Model, 1912, clutch and gears, condition excellent, easy starter, specially built for Mr. Stanhope Spencer; accept £30 cash; would consider exchange, late Triumph Junior preferred.—J. Newbould, Skyreholme, Skipton, Yorks. [X9633

RIDER TROWARD and Co., 31, High St., Hampstead.—Rudge Multi, brand new, 3½h.p. standard, 62 gns.; Rudge Multi, 1916, T.T., I.O.M., very fast, 59 gns.; Rudge Multi, 1916, 3½h.p. standard, 47 gns.; Rudge Multi, 1914 standard, 33 gns.; Rudge Multi, 1913 standard, 27 gns. [9650

Scott.

SCOTT and Sidecar, running well; 40 gns.—Wauchope's, 9, Shoe Lane, London. [9618

Singer.

SINGER, 1913, 3½h.p., 3-speed, free engine, speedometer, lamps, tyres, etc., in perfect condition; £25; also sidecar if required.—133, Archway Rd., Highgate, N. [9543

Sunbeam.

SUNBEAM, 6h.p., and sidecar, in good condition; appointment for view; £75.—Yates, 20, Felsberg Rd., Brixton Hill [9534

SUNBEAM 1914 3½h.p. Combination, also 1916 combination; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9102

SUNBEAM Combination, 3½h.p., 3-speed gear, in perfect condition; £105, cash or easy payment.—Harrods, Ltd., Brompton Rd., S.W.1. [9600

RIDER TROWARD and Co., 31, High St., Hampstead.—Sunbeam, 1916, 3½h.p., T.T., 3-speed, 69 gns.; Sunbeam, 1915, 6h.p., 3-speed, Gloria sidecar, 85 gns. [9651

1916 3½h.p. Sunbeam, with Mills-Fulford coachbuilt sidecar, in perfect mechanical condition, black and gold finish; £82/10.—Robinson's Garage, Green St., Cambridge. [9252

SUNBEAMS.—New 8h.p. and 3½h.p. combinations; immediate delivery with M. of M. permit; also 3½h.p. combinations, latest 1918 model, lamps, horn, speedometer, etc., run few miles, indistinguishable from new; without permit £120.—Parker's, Bradshawgate, Bolton. [X9514

1916 8h.p. Sunbeam Combination, M.A.G., hood, screen, watch, mudshields, speedometer, spare wheel, horn, lighting by compressed gas cylinder, 60 hours to one charge, perfect condition, and as new, very little used; £155.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

T.D.C.

RIDER TROWARD and Co., 31, High St., Hampstead.—T.D.C., 1916, 2-speed, 2-stroke; 24 gns. [9636

Triumph.

TRIUMPH, 3½h.p., splendid condition; 16 gns.—619, Garratt Lane, Earlsfield. [9541

3½h.p. Triumph, 1914 T.T. model, dropped bars, fast, smart; £40.—Wauchope's, 9, Shoe Lane, London. [9619

TRIUMPH, 1913, good order, new engine, 1914, not used since; price £28.—Howard Wilson, 33, Acre Lane, Brixton, S.W. [9477

BABY Triumph, 1914, excellent condition, all accessories, little used; what offers?—Morley, Edwin St., Houghton-le-Spring. [X9664

3-SPEED Countershaft Triumph, late 1915, accessories, and spares, in first-class order.—Pearce, 4, Nursery Walk, Worcester. [X9511

TRIUMPH, 2¼h.p., 2-stroke, 1917, 2-speed, exactly as new, not scratched, speedometer, horn; £50.—Wooldridge, High St., Crewe. [X9657

SPECIAL OFFER THIS WEEK:
LEVIS, 2½ h.p. (latest model).
This machine, which is fitted with a more powerful engine than the Popular Levis, is a most efficient mount.
Our special price, **37 Gns.**

Also the following NEW Machines, latest models in stock, all of which can be supplied without a permit.

1918 MATCHLESS and Sidecar, complete with spare wheel and tyre £125 0
NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed ..... 48 gns.
*LEVIS Popular, 2-stroke .. £32 0
LEVIS, 2½ h.p., 2-speed £47 10
ROVER, 3-sp., kick-starter.. £80 0
ROVER, T.T., Philipson pulley £67 10

SECOND-HAND MACHINES.
1917 NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed..... 35 gns.
* Permit required for this machine.

JULIAN, 84, Broad Street, READING.
'Phone: 1024.
Biggest Light Car and Motor Cycle Dealer in the South.
Closed Wednesday 1.

MOTOR CYCLES FOR SALE.

Triumph.

TRIUMPH.—Two countershaft and several older models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9103

TRIUMPH, 1912-13, clutch model, fitted complete, not used for 2 years; £22/10, near offer.—71, South Side, Clapham Common, S.W. [9587

1916 Triumph, 4h.p., Gloria sidecar, 3-speed countershaft, kick, lamps, etc., splendid condition; 65 gns.—Hall, Elmtree, Howden, Yorks. (D) [X9698

TRIUMPH 1915 Cylinder, piston, front forks complete, pair wheels, foot pump, horn, generator; 45/- lot.—Sticker, 49, High St., Kingston, Surrey. [X9658

RIDER TROWARD and Co., 31, High St., Hampstead.—Triumph, 1913, 3½h.p., 3-speed, sidecar, 35 gns.; Triumph, 1913, 3½h.p., 3-speed, solo, 29 gns. [9652

1914 Clutch Triumph, complete with lamps, horn, tools, and speedometer, in excellent condition throughout; price £35.—V. Sharpe, Manor House, Careby, Stamford. [X9614

TRIUMPH, 1911, clutch model, modernised, many new parts, fully equipped, new condition, ready ride away; £23, lowest.—Hollingsworth, 12, Fredric Cottages, Liberty Hall Rd., Addlestone. [9496

1914 Triumph Coachbuilt Combination, 3-speed, kick start, lamps, horn, etc., splendid condition throughout; exchange for Harley-Davidson, cash adjustment, or sell £46.—Fox, 600, Fulham Rd., S.W.6. [9539

Trump.

1914 Trump-Jap 6-8h.p. Combination, 3 speeds and kick starter, all accessories, everything as new; seen and tried by appointment.—47, Silchester Rd., North Kensington, W.10. [9512

Zenith.

1914 8h.p. Zenith Combination; £50.—Wilson Bramshill, Eversley, Hants. [9514

ZENITH.—Several models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9104

ZENITH, late 1916, 4-5h.p., twin Gradua, T.T., lamps, horn, speedometer, done 2,000, perfect condition; £48, bargain.—W. Ayers, Garage, Kensington Palace, W.8. 'Phone: Park 86. [9593

1916 Zenith-Gradua, 8h.p., double-seated sidecar, only 3,000 miles, C.A.V. electric outfit, speedometer etc., first-class machine, perfect order, many spares; cost over £150, price £100; no dealers; owner bought car.—Apply, A.H.M., 9a, Tranton Rd., Bermondsey, S.E. [9475

MOTOR CYCLES FOR SALE.

Zenith.

6h.p. Twin Zenith Coach Combination, clutch and kick starter; £50.—3, Town Field Villas, Doncaster. [9572

RIDER TROWARD and Co., 31, High St., Hampstead.—Zenith-Gradua, 1914, 3½h.p., re-enamelled, 32 gns.; Zenith-Gradua, 1913, 3½h.p., 27 gns.; Zenith-Gradua, 1911, 3½h.p., 21 gns. [9653

ZENITH, 3½h.p. J.A.P., Gradua gear, Bosch mag., spare petrol tank, electric lighting set, tyres and belt as new, ready to ride away; £25; would consider lightweight in exchange.—Lausdall, 2, Manor Terrace, Felixstowe. [9570

4-5h.p. 1916 Countershaft Zenith, fitted with superior coachbuilt sidecar, includes all the best accessories, twin-cyl. engine, kick starter and clutch, all parts operating like new, speedometer, and several spares and extra included, combination as new; over £100, price £85. Also a 6h.p. countershaft Zenith combination, £85.—Wauchope's, 9, Shoe Lane, London. [9625

Miscellaneous.

THE H.C. Motor Co., 347, Finchley Rd., have the following machines for sale, all guaranteed to be in perfect running order; cash or exchanges:

ZENITH, 1914, 6-8h.p., Bramble sidecar, Bosch, Gradua gear; 49 gns.

RUDGE, 1914, 3½h.p., T.T. Philipson pulley, Senspray, very fast; 29 gns.

PREMIER, 1914, 2¼h.p., clutch model, Bosch mag., in fine condition; 27 gns.

SUN-VILLIERS, 1915, U.H., 2-speed; 26 gns.

PREMIER, 1913, 3-speed, and clutch, Bosch, B. and B.; 29 gns.

VELOCETTE, 2¼h.p., 1915, 2-stroke, 2-speed, lady's model, all-chain drive, nice condition; 24 gns.

CALTHORPE, 1915, 2¼h.p., 2-stroke, 2-speed, B. and B.; 25 gns.

BLUMFIELD, 1915, 5-6h.p., U.H., single-speed, special T.T. model, picked engine, very fast; 30 gns.

ZENITH, 1914, 2½h.p., Gradua gear, Bosch, Amac, T.T. model, dropped bars; 29 gns.

ZENITH, 3½h.p., 1914, Gradua gear, Bosch mag., B. and B., complete with all lamps, etc.; 33 gns.

WOLF-J.A.P., 1916, 2¼h.p., 2-speed, kick-start and clutch, Bosch mag., Amac, machine has just been completely overhauled and done up, and is like new; 29 gns.

SINGER Combination, 1914, 4h.p., 2-speed and clutch, countershaft, Burbury sidecar, good condition; 33 gns.

TRIUMPH, 1913, T.T. model, Bosch mag., in splendid condition; 29 gns.

ELF, 1914, 1¾h.p., single-speed, genuine lightweight; 14 gns.

N.S.U., 5-6h.p., late 1914, 2-speed. Bosch mag., spring frame, run about 800 miles; 47 gns.

ROVER, 1914, 3½h.p., 3-speed, Bosch mag., B. and B., been stored since 1915; 42 gns.

THE H.C. Motor Co., 347, Finchley Rd., N.W.3. 'Phone: Hampstead 4631. Open Saturday afternoons and Sundays. [9596

HARRODS, Ltd., Brompton Rd., S.W.1, will supply any make of motor cycle on the deferred payment system. Write to Motor Dept. for particulars. [9602

3½h.p. Motor Cycle, perfect order, hand clutch, etc.; exchange with cash for higher powered combination (or solo); sell £20. Wanted, N.S.U. gear.—26, Pulleyn's Av., East Ham. [9498

NOW or Never.—1915 Allon, 2 speeds, clutch, £30; 8h.p. Powerplus Indian and sidecar, £65; 1912 3½h.p. Premier, N.S.U. gear, £20; stamp for particulars.—Farrar, 19, Hopwood Lane, Halifax. [6880

DOUGLAS 4h.p. 1915 Combination, also 2¼h.p. Imperial-Jap 2-speed countershaft model, 2¼h.p. Premier lightweight, 2¼h.p. 2-stroke Sparkbrook, 2-speed countershaft; £100 secures the above four machines.—F. G. Tooth, Shottermill, Haslemere, Surrey. [9468

FIRST Cash Secures.—3½h.p. Triumph engine, £6/10; 6h.p. N.S.U. twin engine, Bosch, £7/10; B.S.A. model Auto-Wheel, £8/10; Roc pattern free engine wheel, £1/5; frame, wheels, magnetos, numerous good motor cycles; send requirements; stamp, reply.—Clapham (Motors), King George St., Greenwich. [X9689

£10 to £20 purchases any of the undermentioned machines, all of which are guaranteed in running order: Douglas, 1911, 12 gns.; F.N., 4-cyl., 13 gns.; Douglas, 1911, 2-speed, 17 gns.; Grandex-Precision, 1913, 3½h.p., 2-speed, clutch, 19 gns.; Lincoln-Elk, 1913, 3½h.p., variable gear, waterproof Bosch, 19 gns.; Sun-Villiers, 2-stroke, 17 gns.; Premier, 1913, 2¼h.p., clutch, 19 gns.; Zenith-Gradua, 1911, 3½h.p., 19 gns.; Triumph, 1908, 3½h.p., 9 gns.; Quadrant, 7-9h.p., T.T., 19 gns.; N.S.U., 1913, 3½h.p., waterproof Bosch, 19 gns.; Enfield, 2¾h.p., 2-speed, clutch, 19 gns.; Bat-Jap, 1910, 3½h.p., variable gear, 14 gns.; Wolf, 1915, single-speed 2-stroke, 19 gns.; Humber, 1911, 3½h.p., 2-speed, handle start, 19 gns. Full details on request.—Rider Troward and Co., 31, High St., Hampstead. [9450

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

Advertising and Publishing Offices:
20, Tudor Street, London, E.C.4.
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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

The Message of Peace.

THE end of the war, if the signing of the armistice turns out, as is probable, really to be the end, has come with dramatic suddenness.

"The tumult and the shouting dies,
The captains and the kings depart"

—many of them, it is to be hoped, never to return. It is not the business of this journal, however, to discuss the acceptance by Germany of the armistice with its "fearful conditions"—the armistice which will, we trust, be the beginning of a new era of prosperity for this country and the motor cycle trade.

The motor cycle has played a wonderful part in the war, and England's supremacy in this type of self-propelled vehicle has stood her in good stead, thanks, we venture to say, largely to this journal, which from the year of its foundation—1903—has never ceased to give publicity to, and thus to encourage, motor cycles for army use, as our older readers will remember.

Now we are faced with the problem of peace, to restore motor cycling to its former degree of prosperity. First and foremost such fuel as is available must be released. This means the abolition of the Motor Spirit Restriction Order, which would at once allow motor spirit to be used for any purpose.

Having obtained the release of fuel, the next thing to do is to reduce its price, and with the abolition of war risks freight charges have already fallen to one-half, but more than that is needed; petrol prices must come down quickly to a figure approaching that of pre-war times. We well remember the remarks of the petrol magnate—"The price of an article is what it will fetch"—but petrol has a serious rival in benzole, and more benzole is available now than in 1914, while there is hope of home-produced petrol, and alcohol must not be forgotten.

When the Hun was hard put to it for petrol in 1915 owing to the Russians seizing the Galician oil wells, he used alcohol and benzole mixed, with quite good results. Let us follow his example and run our motor cycles on "Alcobenz," half the price of petrol, nearly as good, and, unlike benzole, unfreezable at ordinary temperatures. Alcohol *per se* is poor stuff. It might be drunk by moral degenerates, hence the restrictions on its sale, and it cannot be used in ordinary engines, but mix it with benzole and we would guarantee that the very worst of habitual drunkards would not be tempted to imbibe the result.

We are next faced with the problem of the new model, and the question of when the new post-war types will be available, and there is also the great problem of discarded Army mounts to be solved.

There is a huge market for moderate-priced machines, and should a first-class make, rebuilt and guaranteed for, say, two months, be made available, it would help to meet the enormous demand for motor cycles which we anticipate, and would give the makers time to develop their later types.

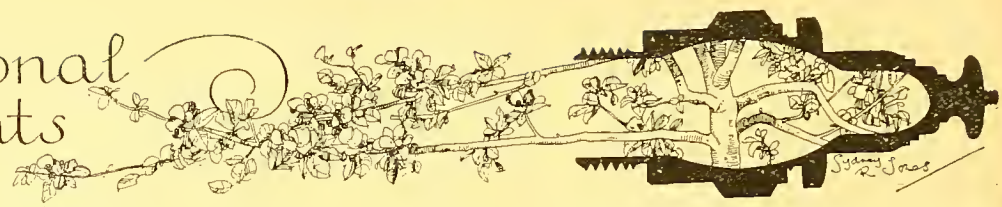
The organisations should "go easy" as regards competitions. There is no harm in a few sporting contests run for pure fun and enjoyment, such as hill-climbs, a few track races, and unimportant minor club road trials, but serious tests, such as the T.T. races and six days reliability trials, should be withheld until the manufactories have settled down.

The prospects of the motor cycle pastime and industry were never more rosy, but the organisations must set a stern face against any proposals to hamper progress by malicious taxation. Motor vehicles are taxed severely enough, they are proved necessities and not luxuries, and revenue should be obtained from other untaxed or insufficiently taxed articles.

It is the duty of every motor cyclist to join an organisation. Unity is strength, and lack of cohesion cannot but damage the cause and lay it open to the predatory instincts of the tax makers.

An index to the advertisements in this issue will be found on the page facing the back cover

Occasional Comments by "Ixion"



Peace!—and Petrol?

WE shall agree that as soon as a few drops of petrol become available for joy-riding, the men with chevrons ought to get the first issue. Above all, men with wound stripes should be assured a juice ration. Then thousands of men will be demobilised slowly, and will be called upon to stay Overseas "tidying up." Presumably such men will receive a small consolation packet in the shape of a good long leave in Blighty at the first opportunity. We should like them to have a few cans at their disposal during that leave: and by the time they come home for keeps, we will do our best to have some pukka post-war jiggers ready, and also some good sporting competitions in which to try them out.

For the Rest—Patience!

FOR the rest of us—indispensables, munitioners, oldsters, unfits, and home service men—a severe test of patience is in store, a test far more severe than some of us comprehend: and unless we play the man in it, England won't be a garden of roses for the last boys home when they reach it. We shall never get back the "good old days," which in many respects were less "good" than we used to fancy. It is up to us to install some "better new days," against the time when demobilisation is complete. In the meantime we have got to police a convulsed Europe, to conduct the difficult and perilous carry-over of industry from war conditions to peace conditions, and to resolve the conjugal tiffs between capital and labour. So we shall not have much time for the present to worry about the supply or quality of petrol, or much chance to use it. Let us make up our minds that it will take us a good two years to tidy up industry, society, and politics at home, and when that is done we can forget all past worries and enjoy the roads again.

A Dream?

I HOPE reconstruction will solve one pathetic problem which has often troubled me. Few of my readers know who or what I may be, apart from this weekly column. But I happen to know the working classes of England better than many men. On any big common or sports ground or racecourse you may see the youth of industry enjoying itself: you may meet it on push-cycles along all our famous highways every Saturday afternoon. With football, cricket, cycling, a girl to court, and a wage that leaves a margin for music-hall and cinema, the young factory hand has a good time, and its joyousness is often written in his face. Look at him twenty years later. When the week-end comes he is too old for sports, and the music-hall and the cinema may begin to pall. He searches for a hobby, and one that refreshes is not too easy to find. Gardening or bowls are not everybody's fancies. The public-house and the racecourse unsteady many of us in the long run. It is possible to have too much of home, especially with a joyless over-worked wife and cramped quarters. There are thousands, perhaps millions, of artisan fathers for whom life would be transformed by an open-air, week-end hobby which offered refreshment plus health but minus exertion, and the wife would share it, too.

Cut Off with a Knife.

FOR necessary purposes the supply of petrol should increase very perceptibly and at a tolerable rate. The Russian *débâcle* may prevent our receiving from the East such full supplies as the opening of the Dardanelles once implied. Shipping questions hardly affect the matter, as tankers are useless for ordinary freights. The big economies are due to the sudden destruction of several huge sponges, which have sopped up millions of gallons of petrol for several years past. The aviation sponge and the tank sponge are notable examples. Rumour has it, for example, that a batch of 30,000 aero engines, all of one make, were on order for the British Air Service alone. Each engine would consume approximately twenty-five gallons of fuel per hour, I suppose. Each engine would undergo tests lasting, say, four hours in all, and would then fly an average of, say, fifty hours on active service. Total fuel consumption for this solitary contract—one of many—perhaps 40,000,000 gallons! I do not know how many tanks we have or what their consumption is. But with flying and tanking cut down to the minimum, the seas reopened, and the Eastern oilfields available, there should be petrol for priority users ere long.

Rustless Steel Finishes.

SOME weeks ago I innocently clamoured for inventors to produce a rustless steel finish, which would relieve motor cyclists of many minor worries. I now hear that there are already at least two such processes in existence, viz: The Firth-Brearley "Stainless Steel" (T. Firth and Sons, Norfolk Works, Sheffield). "Rustless Iron" (Cowper-Coles, Shepperton-on-Thames).

"Stainless Steel," as its name implies, is a specially mixed steel, designed to resist rust and corrosion; its toughness is exemplified by the fact that during the war the output has been almost exclusively absorbed for making the exhaust valves of aero engines. Off-hand, I should judge that it may prove too expensive for application to all the "twiddly bits" of a motor cycle, which at present annoy its owner by turning all hues between orange and black unless he greases them weekly or polishes them daily. The "Rustless Iron" process is a "finish," pure and simple, and consists of adding a very slight zinc coating to the part: sawn sections show that the coating penetrates the original part to a certain depth, so that a zinc-amalgam surface is formed. The natural finish is a dull slate matt, to which a nickel-like polish can be imparted.

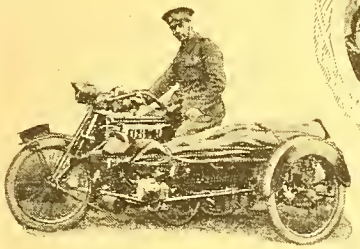
An Appreciation.

To those Readers who have taken an Active Part in the Great War.

YOU have served in every section of our vast military machine which was organised and perfected to destroy others of its kind. In the motoring and aviation sections you have helped to build for our fraternity a reputation second to none among the classes who have won the war. Before conscription made every man a soldier, you flocked to the Colours; we enlisted over ten thousand of you ourselves for those special corps for which you were so fitted to form the nucleus. That you have made good is now history—your exploits have been eulogised by your Commanders-in-chief and the press of the nations.

You have upheld the best traditions of British pluck, and you have shown the world how true sportsmen play the game—even in war, while those of you who have smelt more petrol than powder have worked in the A.S.C., M.T., in a manner well deserving of all praise.

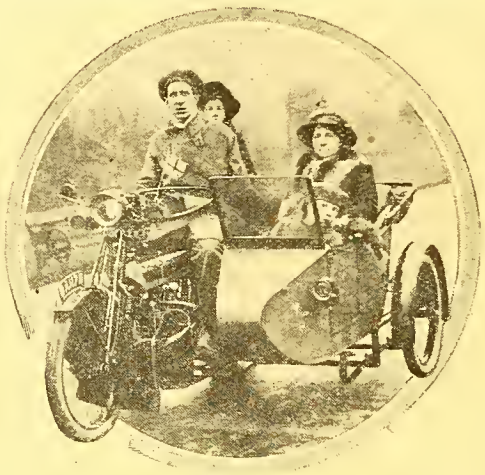
Gentlemen, on behalf of all motor cyclists, we thank you for what you have done and for the splendid way you have done it.



PEACE!—WHAT OF THE FUTURE?

The Motor Cycle and its Place in the New World of Democracy.

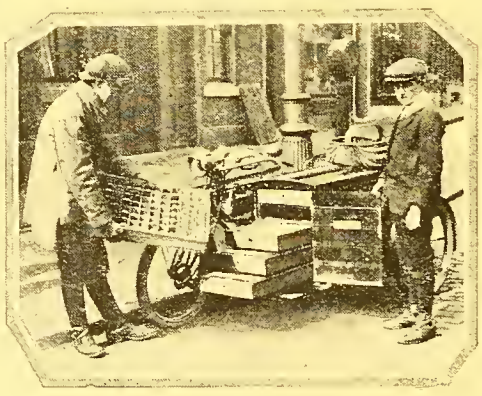
Utility.



Recreation.

Sport.

"NOTHING will ever be the same again" is the cry of the pessimist; but, with different intonation, it may be just as well the cry of the optimist. People speak of the age of highwaymen and pirates as the good old days, and while the present generation may, by force of habit, apply the same phrase to the pre-war period, there is no reason to suppose that post-war days will be any worse. In fact, present tendencies point the other way, and if only that, having known the hardships and discomforts of war, we shall better appreciate those things we had in days of peace.



Business.

The cessation of hostilities marks the opening of a new era for motoring. It will be the third epoch of the motor cycle, and that this epoch will be greater than is generally thought there can be no doubt, when the new conditions which will prevail for the next decade or so are viewed in their full perspective.

The Three Epochs.

Pre-magneto days are clearly divided from the time that followed when ignition troubles were swept away. Hence the first epoch, important as it was, did not leave a very clear mark outside the world of motor mechanics. The second epoch, a period when machines had arrived at a high standard of reliability, was something in the nature of a boom, which was cut short by those madmen in Germany who thought to enslave the world. Thus in times to come we shall refer to these different periods as "Pre-magneto days," "Pre-war days," and "Since the war."

One could almost say that the history of the motor cycle's part in the war forms an epoch in itself; but rather has it been the culminating test of the machines of the second epoch—the chapter in history when the motor cycle has been proved to the non-riding public to be more than the plaything and pleasure machine of the select few. That it made good is now known to the whole world, and while, to the mechanic, the motor cycle is still in the transient stage, the public no longer has this impression. It has passed the stage of experiment—a heavy bicycle with an engine in it—to the man in the street; it has taken its proper place as a machine which can be relied upon to do certain service under the most adverse conditions, service which could not be undertaken by any other type of machine.

Had the war broken out a few years before 1914, say before countershaft gears and the present-day efficient engines had been developed by the Tourist Trophy Races and A.C.U. Trials, the horse as a despatch rider's mount would probably have retained its place in the composition of the armies. As it is, the noble quadruped has lost its value in a branch of military service which was regarded as romantic.

An Essential of Modern Life.

Neither must it be forgotten that on the declaration of war all sorts and conditions of machines were pressed into service—chiefly machines which were in use by their private owners. The fact that this conglomeration of ordinary models convinced the authorities that the motor cycle was all that its sponsors claimed for it is a tribute to the entire industry. That it was imperative to reduce the number of models in use is obvious, and that the Government finally decided upon certain models which, in the opinion of riders generally, were the most suitable for military purposes, was one of the few things in the early stages of the war regarding which deprecatory remarks could not be levelled at the Government.

B.S.A. MOTOR BICYCLES
WITH THE ARMIES AT THE FRONT

German East Africa

In the conquest of German East Africa, the South African Motor Cyclist Corps, all mounted on B.S.A. Motor Bicycles, played an important part. Describing some of his experiences, Capt. F. J. Ashley, C.F., says:—"The road no longer existed. It was either dust or sand, sometimes a foot and even two feet deep. We also struck mud frequently, not the mud of a metalled road, but soft black cotton soil. . . . . But we reached the limit of roads in the last dash to Iringa. The road wound up over and down a mountain pass. Tropical rains had washed away the small stuff, leaving only big stones and rocks, while in places the gradient was 1 in 4, and one place 1 in 3. If I ever wish to think of a combination of grit and reliability I need only think of a S.A. Cyclist on a B.S.A. with fifty miles of G. East Africa road in front of him."

"WITH THE FLAG THROUGH GERMAN EAST AFRICA."

Experiences described by motor cyclist despatch riders in the East African Campaign.

COPY POST FREE.

THE BIRMINGHAM SMALL ARMS COMPANY LTD.
BIRMINGHAM.

The Fables of Fame

The Ninth.

At the close of a glorious day a wayfarer perchance fell in amongst some gipsies. "How splendid it would be," said he, "if I could cover many times the number of miles I've walked to-day, for then I'd learn to know more of the beauties of my country."

"Then let me see what fate may have in store for you," said a woman clad in vivid raiment, yet in keeping with the habit of her tribe. "So be it," said the wanderer, "from out my hand read unto me my future."

"Much travel lies before you, sir, and such will be for pleasure; the speed you'll make will be astonishing, yet comfort will attend you all the while. No loneliness, I see, will be your lot, for another whose companionship you'll welcome will tour the country by your side."

CLYNO

THE Sidecar Motor Cycle

will afford undreamed-of pleasure in the days so soon to come. If you want a peep into the future—to know what pleasures you can *make* it hold for you—send for particulars to-day.

Here is the Clyno Post-war Policy—

Mass Production of One Model (8 h.p.).
Competitive Prices of both Outfit and Spares.
And Strictly Rotational After-war Deliveries.

THE CLYNO ENGINEERING CO.,
Pelham Street, WOLVERHAMPTON

Peace!—What of the Future?—

Thus the war has done much to popularise motor cycles. Thousands of men in mud-bespattered khaki have seen them standing up to service which for a six days trial would have been regarded as strenuous. Soon these men will be back in civilian life, and many of them will think seriously of joining the ranks of motor cyclists. Petrol has been so much a part of the atmosphere of war that every man who has served at home and abroad, in khaki, blue, or civilian attire, looks upon the petrol-driven vehicle as an essential part of modern life. Many thousands of men who before the war were apathetic where motoring was concerned, and even those who were antagonistic, are now alive to the immense possibilities of the motor cycle as a general utility machine, a sportsman's speed mount, and a passenger vehicle for family use.

A Widened Sphere.

The motor cycle hitherto has been connected closely with a certain class of the community—a small section of the large middle class. The section has been widened considerably as a direct outcome of the war. Thousands of the superior working class will enter it. They were potential buyers before the war—but the margin over and above their cost of living was so narrow that they hesitated: waited until prices came down to their level. The war has changed their earning capacity, and they have now money put by which will enable them to purchase machines immediately they are available. From this class alone the possible demand for motor cycles is enormous, while even among "ordinary" working men the motor cycle has a strong appeal which provides an outlet for second-hand machines greatly in excess of any anticipation justifiable a few years ago.

In short, the motor cycle promises to take almost as large a place in the world of wheels as the pedal cycle. It is safe to assume that the motor cycle will become the most popular vehicle in the new world of democracy, which will require reliable and speedy means of getting about its business of rebuilding the countries that have been devastated and of repairing the shaken foundations of those that have not.

The Handiest Means of Transit.

It is almost impossible to imagine a sphere in which the motor cycle cannot play an important part, and its convenience will undoubtedly have a certain definite influence upon the housing problems of the future. Before the advent of the bicycle it was not convenient for the business man, the clerk, or the artisan to live more than a mile from his work. The bicycle permitted an extension of the suburbs of every manufacturing town. The motor cycle does more—it allows the city worker to live several miles out in the country: it permits factories to be built away from congested districts because the labour required does not necessarily have to be found in the same locality. This is very desirable on hygienic grounds, as well as reducing the cost of production because of the lower cost of ground space.

In every business which entails a great deal of walking, such as local "travelling" for wholesale houses, canvassers of all trades, ambassadors of commerce journeying from town to town, plumbers' and builders' gangs, telegraphic linesmen, etc., etc., the motor cycle will become as essential as other equipment. Time has always represented money, but in the business of life that lies ahead its value will be enhanced, and, in consequence, every means to reduce waste time will receive first consideration by our captains of industry and of public service. The motor cycle, therefore, will be bought by employers of labour, and will become recognised as part of the machinery of trade and commerce.

Parcels Delivery.

For light delivery there is an immense field practically untouched. When times become normal again, and the element of competition once more enters into the business of shopkeepers, the butchers' and game dealers' carts will be replaced by sidecarriers. The grocer, too, will find that the upkeep of such a machine is less than the time-wasting horse vehicle on account of its increased speed and corresponding wider range of operation. In pre-war days tradesmen knew the value of prompt delivery of customers' purchases, however small, and while a mile run out with a horse vehicle with a small parcel was not a paying proposition, a youth with a motor cycle can be out and home again in a few minutes. There is scarcely a retail trade for which motor cycle delivery is not suitable, while in the postal and telegraph services the self-propelled cycle is likely to take an important place. One may go on without end when the utility of the motor cycle is fully considered.

How long will it be before we witness such scenes again? A meet of competitors for the Colmore Cup Trial, 1914.

Peace!—What of the Future?—

As a pleasure vehicle, the scope of the motor cycle is bound to be extended. It will become more than a pastime in itself; it will add to the pleasures of other sports and recreations—in fact, there is only one pastime in which it will not play a part: that of pedestrianism. It will provide sport also; dromes may be built for first-class indoor motor cycle racing such as this country has never seen, and cross-country competitions may be organised to allow private owners to display their skill. Touring will be undertaken by thousands where before the war there were only hundreds, and in providing a healthy and fascinating hobby to those who may not otherwise leave the precincts of the crowded cities the motor cycle will be the means of making better and more capable men of new generations.

Abroad, the fields of utility are as wide for pleasure, business, and pioneer work, while in the make up of the armies of the future—if armies there be—the motor cycle will largely replace the horse for mounted infantry, in addition to the many purposes for which, in the great war of 1914-1918, it has been tried and found efficient.

Truly, it may be said that the third epoch of the motor cycle will be great—beyond the imagination of riders before the war—and far-reaching in its influence upon the peoples of the whole civilised world.

WHICH TYPE?

An Invitation to Motor Cyclists to give the Specification of their Ideal Machine.

YOU HAVE IDEAS as to what constitutes an ideal machine for your own requirements. Fill in the form below and post it to the Editor of "THE MOTOR CYCLE," and so help us to show British manufacturers what the buying public has in mind.

20, Tudor Street, London, E.C.4. Hertford Street, Coventry.

FOUR GUINEAS WILL BE DISTRIBUTED AS FOLLOWS:

ONE GUINEA for a solo machine specification.

ONE GUINEA for a sidecar machine specification.

ONE GUINEA for solo machine improvements.

ONE GUINEA for sidecar machine improvements.

The awards will be made for the specifications which, in the opinion of the Editor, conform most nearly to the ideal designs compiled from the forms sent in.

The awards will be made for the best lists of suggestions connected with improvements in design and equipment.

The Editor's decision is final.

Please strike out the subjects which do *not* appeal to you.

Engine.—..... h.p. Long stroke or short stroke. Approximate capacity in c.c. ..... Two-stroke or four-stroke. Single, V twin, flat twin, or four-cylinder. Air-cooled or water-cooled.

Carburetter.—One or two levers.

Magneto Drive.—Chain, gears, or shaft. MAGNETO POSITION: Before or behind engine, central.

Lubrication.—Hand pump, semi-automatic drip, mechanical, forced feed, automatic, throttle-controlled, or petroil.

Gear Ratios.—One, two, three, four, or infinitely variable.

Transmission.—FROM ENGINE TO GEAR BOX: Belt, chain, shaft, gears. FROM GEAR BOX TO ROAD WHEEL: Belt, chain, shaft, with worm or bevel.

Type of Gear.—Epicyclic, sliding gear, dog clutch engagement, expanding ring, or expanding pulley.

Clutch.—Dry plate, wet plate, single or multiple, cork inset. CONTROL: Hand, foot, or both.

Frame.—Rigid or sprung. Diamond or open. Straight tubes or bent. Loop, girder, or duplex.

Forks.—Any particular type .....

Seat.—Sprung saddle, sprung saddle-pillar, or semi-spring frame (as Edmund and Bat).

Handle-bars.—Upturned, flat or dropped, semi-T.T. or D.R.

Brakes.—FRONT: In V rim, conventional shoes, expanding or contracting on hub. REAR: In V rim, on outside of V of rim, expanding or contracting on hub.

Wheels.—Detachable or not. Size of tyres ..... × .....

Lighting.—Dynamo, battery, acetylene generator, or gas cylinder.

Solo or Sidecar.—RIDING EXPERIENCE: ..... years.

Mudguards.—.....

Name and address .....

.....

NOTE.—If experience includes service as a D.R. or in the M.T. corps, please give some particulars.

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PETROL—SOON.

Motor Cycling Permissible for any Purpose within a Radius of Thirty Miles after December 1st.

AS soon as peace is signed it is anticipated that petrol allowances will be granted for ordinary motoring. Such was the substance of the Petrol Controller's statement to the Automobile Association last week.

The extent to which allowances will be increased will greatly depend on requirements for military motor transport. The Association, however, received an assurance that restrictions on petrol consumption will be removed as rapidly as possible.

It is almost certain that at first petrol will be granted under licence, which to all intents and purposes is a system of rationing and the sanctioning of its use, but if only two gallons per month were granted to motor cyclists it would give a great deal of satisfaction. How soon petrol will be released in unlimited quantities one can only conjecture, but our impression after several interviews with Government officials is that the date is not far distant. In the meantime the following modifications of the petrol restrictions are announced :

From November 17th private motor vehicles may be used for going to the nearest church between 6 a.m. and 10 p.m., but no additional petrol will be granted.

From December 1st motor vehicles of any type may be used for any purpose by licence-holders within a radius of thirty miles of the residence or business of the licence-holder.

After January 1st the Petrol Control Department will consider applications from owners of commercial and public utility vehicles for an increase of petrol. *Very soon afterwards the Department will consider applications from private vehicle owners who do not now hold licences.*

The operation of the Order restricting deliveries by retail traders to a radius of ten miles has been deferred until further notice.

The Standing Joint Committee of Mechanical Road Transport Associations, which has been urging on the Government the national necessity for the earliest possible reduction in the prices of petrol and paraffin, has been informed by the Director of the Petroleum Executive, Sir John Cadman, that there is good ground to hope that unless there is an unexpected change for the worse in the position some reduction in these prices will be possible either at the beginning of December or January next. Altogether the fuel position is very hopeful.

MINISTRY OF MUNITIONS PERMITS.

In Justice to the Trade this Handicap should be Removed Immediately.

WHILE it is practically certain that many of the restrictions and regulations under D.O.R.A. will remain in force for the duration of the war, which, technically, covers the whole period until peace is signed and six months after, there are several which, in the interests of the nation, should be rescinded with the least possible delay.

Generally speaking, the Government is acting in a very broad-minded manner over these things, and the armistice was scarcely signed before the machinery was set in motion to reconstruct the Empire. Everything considered, no one has much room to complain on this score, and, probably, by the time these lines appear in print the restrictions to which we are about to refer may have been removed. We refer to the necessity to obtain a Ministry of Munitions permit before purchasing a new motor cycle or car. Within a few days of the commencement of the armistice we were informed that this regulation was impeding civil business. Several motor cycle manufacturers have certain stock ready for the market, but are unable to dispose of it because of the "embargo," and, in addition to the demand for new machines, there is the question of repairs.

A Public Service.

It is now the Government's duty to do everything in its power to assist manufacturers to divert their energies into channels of ordinary commerce, and as this regulation concerning permits is a stumbling block, we urge that the matter be given immediate attention, if it has not been done already.

It is, of course, unreasonable to expect everything to be done at once—we are still in a state of war—but to rescind this Order undoubtedly will assist the trade which has given up so much for the nation in its hour of need, and it should be one of the first objects of the Government to see that nothing is left undone which can be of service to the public, the trade, and the men employed.

SPARE PARTS.

THERE are quite a number of motor cycles at present laid up in a useless condition on account of the inability of their makers to supply certain spare parts. With most manufacturers the supply of replacement parts is almost entirely exhausted, and until the stocks are replenished many motor cyclists will be unable to use their machines. The manufacture of replacement parts for an abandoned model is never a very attractive proposition at a time when every effort is being made to produce a new type of machine, but we trust makers will do everything they can to alleviate the somewhat unfortunate position in which owners through no fault of their own now find themselves.

It is in the interests of the whole motor cycle world that the question of replacement parts should receive the same attention as complete machines.

PEACE MODELS.

A Brief Announcement of the Future Policy of Forty-eight Manufacturers and a List of Models likely to be Available in the Near Future.

THREE things prompted us to secure the particulars of post-war policies given on this page. First, we knew that the signing of the armistice would be regarded by motor cyclists as the opening of a new phase in motor cycling; secondly, we appreciated the necessity for the industry to "get going", again as quickly as possible; and thirdly, it is in the interest of the country that all sports, pastimes, and recreations are resumed without delay, because their revival is the nation's finest safety valve during reconstruction.

Despite the limited time at our disposal, our representatives visited the majority of makers in London, Coventry, Birmingham, and Manchester, while the long distance telephone placed us in direct touch with the Nottingham and Yorkshire firms. Obviously, it is impossible to give details here of these conversations with the captains of industry to whom we look for our future motor cycles. Sufficient it is for the moment that most of them were able to give us brief particulars of their post-war plans, a few were not ready to do this, and some preferred to leave the matter entirely in abeyance. We may say that we found most firms exceptionally enthusiastic and eager to resume business with the motor cycling public. Some, however, were more reluctant to say anything, and appeared to be suffering from the reaction of war-time strenuousness. Summarised, however, we do not think it will take long for the bulk of the trade to resume manufacture of their normal productions.

There is no doubt that the end of the war came unexpectedly to the majority of motor cycle makers, who were not prepared for the "change-over"; but, taken generally, there is undoubted satisfaction at the prospect of a fresh start in the world of conventional commerce.

A.B.C.

This company announces that arrangements for mass production of a new model are already completed.

Abingdon.

Messrs. Abingdon-Ecco, Ltd., advise us that the 6-7 h.p. King Dick and its sister 3½ h.p. models will be the first of the peace models.

A.J.S.

Messrs. A. J. Stevens will market their 6 h.p. military model. The lightweight machine, winner of the Junior T.T., will be abandoned in order to permit manufacturing facilities to be devoted to the sidecar machine.

Alldays and Onions.

The Allon single-cylinder two-stroke will be catalogued only. Concentration upon one model will be the policy of this company for the present

Ariel.

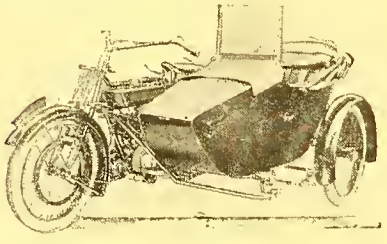
The well-known 3½ h.p. and 5-6 h.p. Ariels will be the immediate post-war models of Messrs. Components, Ltd.

Bradbury.

When "change-over" arrangements in the factory are completed a new lightweight four-stroke model, together with the well-known 554 c.c. single and 750 c.c. twin, will be marketed.

Brough.

A new 3½ h.p. flat twin embodying several innovations will be the sole model of the Nottingham concern, which henceforth will concentrate upon one type. Its features will include new cylinder design, improved carburetter heater, and efficient silencer. This model will be ready almost immediately.



B.S.A.

The 4¼ h.p. single, which has done such good service with the French Army and as the motor light infantry in the African campaign, will be the immediate post-war B.S.A.

Calthorpe.

The Calthorpe range for 1919 will be practically the same as announced before the restrictions compelled a cessation of activities. This includes a 4 h.p. twin, 2¼ h.p. two stroke, and 2½ h.p. four-stroke lightweight.

Campion.

An 8 h.p. twin, 3½ h.p. single, and 2½ h.p. two-stroke will make up the Campion range for 1919.

Chater-Lea.

The 8 h.p. No. 7 combination will be offered as soon as possible.

Clyno.

The post-war model will be an entirely new proposition embodying several interesting features, including 28×3in. wheels, a spring frame, sprung sidecar wheel, and an 8 h.p. twin engine with detachable cylinder heads.

Dot.

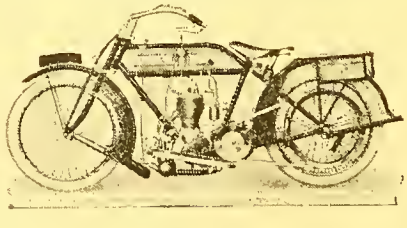
This Manchester concern will concentrate chiefly upon a new lightweight with a 3 h.p. engine and the Dot duplex frame. It is not yet possible for the makers to say whether the engine will be a twin or a single.

Douglas.

The Douglas policy will be announced shortly.

Excelsior.

Messrs. Bayliss, Thomas, and Co., will market four types—a lightweight with J.A.P. 2½ h.p. four-stroke engine, another with a two-stroke unit, and 5-6 h.p. and 8 h.p. twins.



Harley-Davidson.

The importation prohibition makes the English policy of the H.-D. firm uncertain. No doubt immediately restrictions are removed the latest models will be available in limited quantities. The Harley Co. has a new flat twin model.

Hazlewood.

The "Big H." firm anticipates that it will be able to resume manufacture of motor cycles in the new year.

Hobart.

This Coventry firm will market a lightweight with spring frame.

Humber.

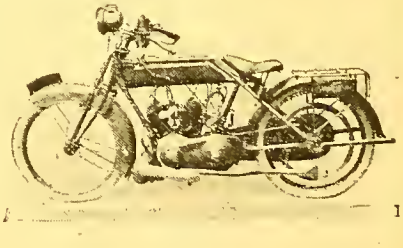
This well-known firm has been so closely allied with the production of aircraft that, with the other branches of its business (cars, bicycles, etc.), it is not expected that more than one Humber motor cycle model will be marketed when the company is able to devote more time to civil business. In all probability this will be the 3½ h.p. air-cooled flat twin.

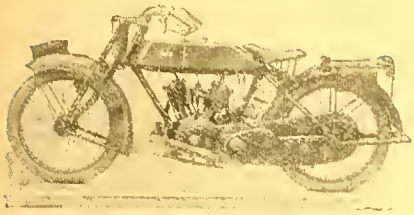
Indian.

The arrival of new Indian models when the embargo is removed is patiently awaited by those British motor cyclists who prefer the American type of machine. The Indian little flat twin has not been seen in this country yet.

Ivy.

A restart should be possible early in the new year, when Messrs. Newman will reintrodnce their two-stroke model which has proved so satisfactory.





James.

This firm is in a position to deliver its several models at once. Orders will be executed in order of rotation. The range includes 500 c.c. twin, 4¼ h.p. "Big Single," 2¼ h.p. two-stroke, and 5-6 h.p. twin.

Levis.

A limited number of the Levis two-stroke will be available almost immediately.

L.M.C.

Two modified war-time models with 4¼ h.p. single and 6-7 h.p. twin engines will be marketed early in the new year. These will have countershaft gear and chain-cum-belt transmission. A new spring frame model will be ready soon.

Matchless.

The W.O. 8 h.p. combination is the post-war Matchless, and for the time being Messrs. Collier will concentrate upon this model.

Morgan.

The G.P. and De Luxe tourist models, as supplied on special permits during 1918, will be the immediate post-war machines of the Malvern firm.

New Hudson.

This firm has been so closely connected with the production of munitions that its motor cycle policy is not yet decided.

New Imperial.

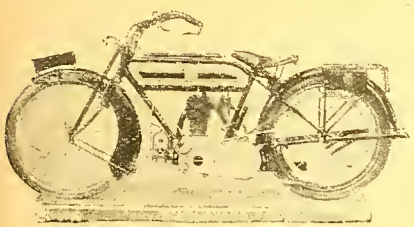
A new spring-frame machine will be available very shortly. In the meantime this firm will market its war-time models.

Norton.

"Singles only" is the post-war policy of the "long-stroke" firm. The "Big Four" with chain transmission and countershaft gear, the 500 c.c. single gear speed model, and a 3½ h.p. tourist will be catalogued.

N.U.T.

A vigorous policy has been decided by the Newcastle firm, particulars of which will be announced later.



O.K.

Messrs. Humphries and Dawes have an interesting proposition in the lightweight field. In future this firm will make one model only, and all units and fittings will be built in its own factory.

Overseas.

The first models to be ready will be a 3½ h.p. single and a 6-7 h.p. twin. A new model with spring frame is promised for early in the new year

P. and M.

A new single-cylinder model will be ready early in the New Year.

Premier.

A new passenger machine of interesting design will be ready shortly.

Raleigh.

The makers of the old Raleighette and the well-known Raleigh bicycle will market a 6 h.p. flat twin with spring frame. One of the few entirely new models which will appear on the market.

Rex.

A new big twin Rex with spring frame may be expected in the spring. Manufacturing arrangements are not yet quite ready.

Rover.

The new 6 h.p. twin model probably will be the leading line of the Rover Co., but the 3½ h.p. with countershaft gear undoubtedly will be marketed.

Royal Enfield.

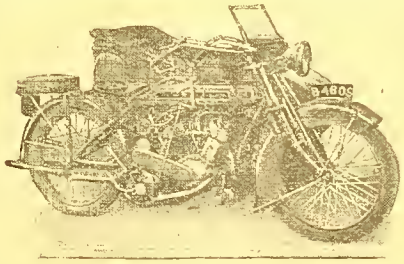
The post-war range of the Enfield Cycle Co. will include most of the pre-war types, including the 6 h.p. combination (8 h.p. engine optional), 3 h.p. twin, and two-stroke lightweights.

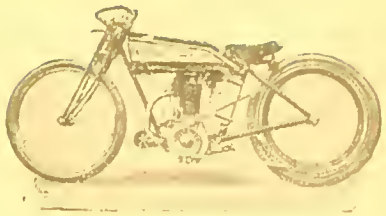
Royal Ruby.

The big twin outfit designed for the Russian Government, but conforming in many ways to the ideals of the British and Colonial rider, will be the post-war model of this concern. It is fitted with an 8 h.p. J.A.P. engine.

Rudge.

As has been anticipated by sporting motor cyclists, the T.T. model—the winner of the last T.T. race—will be





included in the Rudge range of models for 1919. In addition to the T.T. model, the 3½ h.p. tourist and the 750 c.c. single, both with the multi-gear, will be catalogued.

Scott.

Post-war policy undecided.

Sparkbrook.

The post-war model will be a Villiers-engined two-stroke lightweight similar to the one marketed in 1914 and 1915. The manufacture of the 6 h.p. combination will not be continued.

Sun.

The Sun-Vitesse lightweight with semi-open frame, as illustrated in a recent issue, will be the main proposition of this concern. Several other models will be catalogued.

Sunbeam.

The 3½ h.p. Sunbeam, with minor improvements, is being retained as a post-war model, while the twin model will be the 8 h.p. machine, which has been used with such success as a sidecar ambulance in France.

Triumph.

The 4 h.p. countershaft model, used in such numbers by His Majesty's Forces, will be available for the public immediately the Government give the makers permission to accept orders.

Veloce.

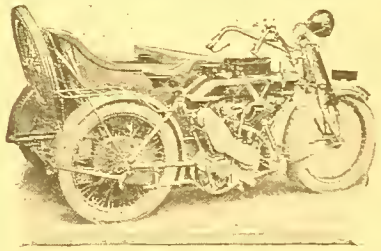
A limited number of the economical model D two-stroke Velocette will be available in a few weeks' time. Early in the new year a new model will be introduced embodying a new frame and a clutch contained in the flywheel. This firm also has a few 3½ h.p. and 2½ h.p. four-stroke models.

Wooler.

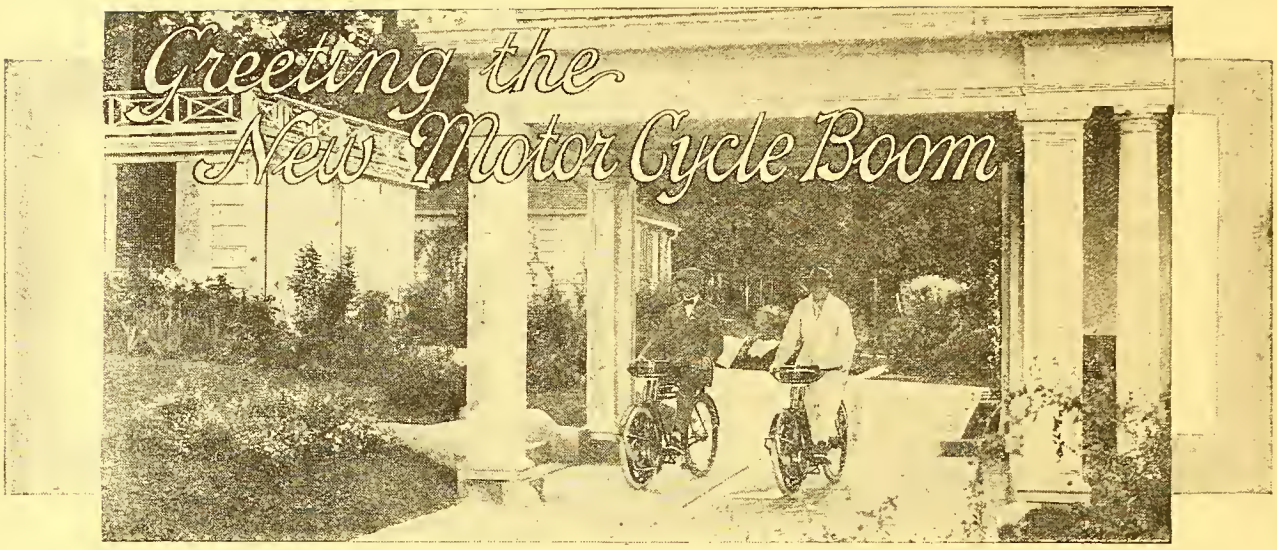
This enterprising firm is engaged upon the production of a new type.

Zenith.

Two twin models, with 4-5 h.p. and 8 h.p. engines and the well-known Gradua gear, will be the post-war Zeniths.



Greeting the New Motor Cycle Boom



The whole world awaits a motor cycle which can be used without the necessity to don special clothing.

THERE are booms and booms. Some are boons and some are bubbles. The new motor cycle boom promises to be the former, and, in any case, will never be the latter.

It is not a case of the wish being father to the thought that impels so many optimists to prophesy the great future that undoubtedly lies before the motor cycle as a vehicle of pleasure, sport, and utility. The majority of these prophets have no axe to grind whether motor cycles are used in thousands or hundreds, therefore they cannot be accused of knowingly exaggerating. It is just confidence and foresight that cause so many to predict the coming boom, which, starting from where the industry left off when the nations went to war, will grow quickly but firmly into a great branch of the engineering world. At present no one can guess to what magnitude the industry may expand. It depends largely upon the manufacturers themselves, upon their new and broader conception of their responsibilities, upon their decisions concerning such points as quantity and quality production, inferior workmanship and material or simpler designs to reduce cost, and many other matters which have good or bad influences upon public opinion and consequently upon demand.

> The war is now at an end. The motor cycle as a pleasure machine is to come into its own again with the greatest boom in its history.

A Suggestion to Makers.

In greeting the new boom, which already exists so far as demand is concerned, we take the opportunity to suggest to manufacturers that they emulate the same unity which has characterised the Allies in their fight against militarism; that, instead of regarding their colleagues of the industry as competitors, they co-operate more and so present a strong front to their real competitors in other lands in order that they may meet them on more equal terms on the battle grounds of Overseas commerce. In the past, we fear, the British manufacturer has been more concerned about what is going on in his own town than what the manufacturers of other countries are doing. That these latter competitors are our allies—France, Italy, and the U.S.A.—and will make the competition of a very friendly and almost sporting nature, should not cause our manufacturers to forget that it is everyone's duty to re-create the great export trade which is one of the mainstays of his own country.

To secure their full share of this trade they must continue to produce machines of the same sterling quality with which the word "British" is synonymous. In addition, the requirements of the Overseas markets must be more closely followed. The whole secret of successful trade is to provide that for which there is a demand. British manufacturers can meet that demand if they will—first by suitable designs, secondly by adequate commercial arrangements, thirdly by prices that compare favourably with those of other aspirants to the Overseas trade.

Spare Parts.

The question of spare parts has always been a weak link in the chain connecting Overseas buyers to the British manufacturer. In resuming relationship with the wholesale houses abroad this question is likely to prove a formidable obstacle which must be overcome. It is not an insurmountable difficulty; the American motor cycle industry has overcome it by enterprise. That same enterprise must animate the industry of this country. Never must it be said that we *cannot* do what has been and is done by our friends across the Atlantic.

Upon this question of Overseas trade depends much that is of great importance to the motor cyclist at home. Increased outputs mean decreased prices, and decreased prices mean increased numbers of riders in this country who will bring their weight to bear upon questions affecting the comforts, the pleasures, and the pockets of us all.

There is one other point which will go a long way to popularise the motor cycle—the question of mud-

Greeting the New Motor Cycle Boom.—

guarding and clothing. Before the war the former problem was receiving more careful consideration, and while the latter may not appear to be a matter in which the trade need interest itself, undoubtedly it should, since it is likely to influence sales. The two things do not exactly revolve around each other. Better mudguarding would render the weatherproofing of the rider less necessary, but something should be done to influence tailors to cater for the motor cyclist rather than leave this question to rubber and tarpaulin manufacturers.

A new boom is on the horizon. Let us—riders, makers, and the press—do everything we can to help it along. Let us prevent, if we can, the waste of precious years by any foolish short-sighted policy which may appear to benefit the individual, but which may be inertia or selfishness capable of retarding the progress of that which, at the dawn of a new era, promises so much.

Motor cyclists in winter garb. Makers can remove the necessity to create such "fashions."

THE POST-WAR CLYNO.

8 h.p. V Engine, Spring Frame and Carrier, 28in. × 3in. Wheels.

AT least three of the well-known machines which were in the "5-6 h.p." class before the war will be fitted with larger engines when the post-war model is introduced. These are the Enfield, Sunbeam, and Clyno.

Brief particulars of the last-mentioned machine are now available, together with the news that the post-war policy of the Clyno Engineering Co. includes concentration upon one model only—an 8 h.p. sidecar combination.

The 42° V twin engine has a medium compression and cylinders with detachable heads. The bore and stroke are 76 mm. × 102 mm. respectively—the total capacity being 925 c.c. Apparently the big ends differ from those of the 5-6 h.p. model, inasmuch as, since four row caged roller bearings are mentioned, it is reasonable to suppose that the big ends follow the more conventional lines with one of the connecting rods of the forked type

The gear box and clutch, too, are new, the latter being of the multiple-plate type with cork inserts with a single adjustable spring.

A spring frame is not the least interesting item in the specification. Full particulars are not available, but leaf springs are used, and the carrier forms part of the sprung portion; the sidecar wheel, too, is sprung. The sidecar lugs are brazed to the frame as in the pre-war model, but Brampton spring forks are quoted instead of the Druid type previously used. The former type has, however, been used on the Clyno machine guns.

The wheels are to be 28 × 3in., another point which will make strong appeal, while the inclusion of "leg shields" as part of the standard specification is worthy of mention. This is not the only point where the designers have considered the question of cleanliness; the mudguards are to be exceptionally wide. The size of the front guard is given as 5¼in. wide at the front, spreading out to 8in. at the rear, while the back guard will be 5in. wide with a deep valance.

The gear ratios are 4½, 8½, and 14 to 1, while the wheelbase is given as 58⅜in., overall length 90½in.

Altogether the post-war Clyno appears to be a very attractive proposition.

A WORD IN SEASON.

PROBABLY there is a great deal of discontent just now among a few of our motor cycle makers on account of the position in which they find themselves on the eve of a new boom in motor cycles. These concerns willingly converted or sold their machinery, rearranged their factories and organisation in order to produce articles of war. It may take several months to get back into the motor cycle field, and—as so many competitors are in a more favourable position—they ask themselves, is it worth while to do this when existing facilities are suitable for some other commodity, and the chances are against them re-establishing themselves in their former position? To these few old friends in the trade we say there is no need to abandon a valuable goodwill because a resumption of manufacturing the articles which have built it is likely to be delayed. What does it matter if competitors have twelve months' start? Before the war some of the highest reputations were held by comparatively new makes introduced when their leading competitors had a "start" of at least a dozen years. There is always room for a good article, and the firm that produces it will have just as good a chance of success in 1920 as in 1919.

CURRENT CHAT

SPECIAL FEATURE

PEACE! WHAT OF THE FUTURE? COMPETITIONS AND THE PUBLIC. PEACE MODELS.

Time to Light Lamps

GREENWICH TIME.

Nov.	21st	... ...	4.33 p.m.
,,	23rd	... ...	4.30 ,,
,,	25th	... ...	4.28 ,,
,,	27th	... ...	4.26 ,,

Spring Frames.

At least a dozen spring frame machines will be included in 1919 models.

War-time Petrol.

Many motor cyclists have expressed their opinion that it is possible to "put out a fire" with war-time petrol. We note that in America "Hun agents" have been filling fire extinguishers with it, so it would appear that the statement is vastly exaggerated.

A Proposed Meet.

No doubt many motor cyclists will be celebrating the reopening of general motor cycling on December 1st, the date when petrol may be used for pleasure riding, and it is suggested that a meet be held at the Wisey Hut on that date. Motor cyclists interested should arrange to arrive at the Hut at noon.

Ex-army Machines.

A prominent motor cycle manufacturer, who is, unfortunately, not in a position to turn to motor cycle production at once, suggests that he and others similarly placed would each be glad to take, say, 5,000 of the Army machines and rebuild them for the immediate market, and so remove a hiatus during the period of change-over.

The Manufacturer's Atlas.

This week in many a motor cycle maker's office the office atlas has been in great demand. Firm after firm as we visited them were found poring over maps of everywhere from the United Kingdom to Tropical and Polar regions. Why this sudden eager study of geography? Agencies. That was the reason. Firms are being inundated with requests from agents in all parts of the kingdom a hundred times a day.

The Late Aubrey Bashall.

It was to be hoped that with the end of the war that the loss to the movement of bright and happy young men who helped to build up the industry and pastime would cease, but it is not war alone which claims victims, and it is with great regret that we have to announce the death of Aubrey Bashall, the youngest of the Bashall brothers, who died on the 14th inst., aged 23. He contracted a severe chill during the London-Exeter run on Boxing Night, 1913, from which he never completely recovered. Both his brothers were with him in the competition, and all three gained gold medals.

New D.R.'s Club.

A number of Signal Service D.R.'s are forming a club for Despatch Riders with the object of creating a widespread organisation having sporting and social functions. They hope later to become affiliated to the A.C.U. D.R.'s wishing to join should write the Provisional Committee, R.E. Signal Service D.R.'s Club, R.E.F. Depot, Wellingborough.

Some Peace Day Impressions.

Not long after the glorious news came through that the armistice had been signed and the war was over, London streets presented a scene that will never be forgotten. It could then be said that the motor vehicle had come into its own. The scenes of enthusiasm defied description. Every vehicle returning empty of goods carried its quota of joyous youths and maidens: some in khaki, some in the uniform of the King's Navy, Q.M.A.A.C., girls of the W.R.A.F., W.R.E.N.S., and land workers, and caps were freely exchanged.

Motor cyclists were few and far between; in fact, one of the unhappiest-looking members of the whole crowd in the Strand was a poor A.C.U.M.M.D. despatch rider bestride a solo machine. We should imagine that the cause of his sorrow was that he had no means of taking a passenger with him. A Government motor cycle, with W.D. in large letters on the sidecar, carried three in the body of the latter, the driver on the saddle, and a passenger on the carrier. The other few motor cycles that we saw were equally heavily loaded.

A scene on Armistice Day. A heavily loaded Enfield with a youthful burden.

THE MOTOR CYCLE

AVIATION SECTION

Big Revival of Interest in Passenger Services.

A Hun Aerodrome.

The huge aerodrome at St. Denis Westrem, near Ghent, from which the Gothas raided London, was ploughed up when the Huns left it, ruining its surface, hitherto like a billiard table.

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The Future?

What are all the enormous aircraft firms going to do now? At least one of the largest and perhaps best known of all in this country is switching over into the allied industry of motor car production. The machinery is already in existence for the change, and may, by the time these words appear in print, be in motion. But the change is by no means so simple or so natural as it sounds.

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Public Asked to Report Low-flying Airmen.

Maj. Baird states that seven fatal accidents have occurred in the past three months at air stations in the district round Oxford, in addition to three accidents which have occurred at Oxford itself. The orders against low flying are impressed on all concerned, and severe disciplinary action has been taken in two recent cases in which they have been infringed.

Public attention is being drawn to the orders that infringements may be reported as fully as possible. The Air Council would be grateful if members of the public would assist them in the matter by reporting the number painted in large block letters on the wings of any low-flying aeroplane.

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London-Paris Air Service.

When circumstances permit, Mr. Holt Thomas, of the Aircraft Manufacturing Co., will institute an aerial passenger service between London and Paris, the arrangements for which will be in the hands of Aircraft Transport and Travel, Ltd., in London, and the Compagnie Générale Transaerienne in Paris. The departure from London will take place from the Ritz Hotel, and the journey to the Hôtel Ritz, Place Vendôme, Paris, will occupy three and a half hours. Weather permitting, the service will be daily, the fare being £15 15s. Tickets can be obtained at the Ritz Hotel, Piccadilly, London, and passengers will be carried in rotation, according to the number of the ticket held.

Until new designs are produced, machines which have recently been bombing the enemy will be used. These machines have twin engines, and, with a load of 3,250 lb., travel 128 m.p.h.; they climb 5,000ft. in five minutes, and can loop the loop.

The Atlantic Flight.

A distinct revival of interest in the Atlantic flight has come with the war-end. All eyes, of course, are turned on the two principal producers of giant planes—Messrs. Caproni and Handley-Page. Signor Caproni has entered a 5,000 h.p. machine and submitted plans for another of 1,800 h.p. Handley-Page interests have entered a machine, to fly probably in the name of the American Aero Club. It is understood that the question of allowing an R.A.F. pilot machine to enter the lists will be considered in a few days.

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Opinions on Post-war Flight.

An airman's view: "For getting quickly from one place to another, probably aeroplanes will be used. From the pleasure point of view, there is nothing in it. All very well to talk about the exhilaration of flying: it is too deadly monotonous—nothing but the noise of the machinery with a strong wind against you, and nothing to see. If you are low down, so that you can see the houses and trees, you get the sensation of speed. If you are high up, you may be travelling at 50 or 150 m.p.h., but you don't know the difference. High up it is like having a sea or a mist all round you. There is no pleasure in it. The aeroplane is not a pleasure contrivance."

An engineer's view: "It is not recreation. It is a trying business. Only people with a good deal of land can have aeroplanes, but the owners of such land are not young, usually. It is the young who will want to fly—until they find out the monotony of it; but the young cannot afford the expense."

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The Atlantic Flight.

R.A.F.'s Record.

Since June 1st British airmen have destroyed 2,087 enemy machines and driven out of control 740.

The R.A.F. Independent Force dropped 536 tons of bombs on German towns in their 286 raids in the past 23 weeks.

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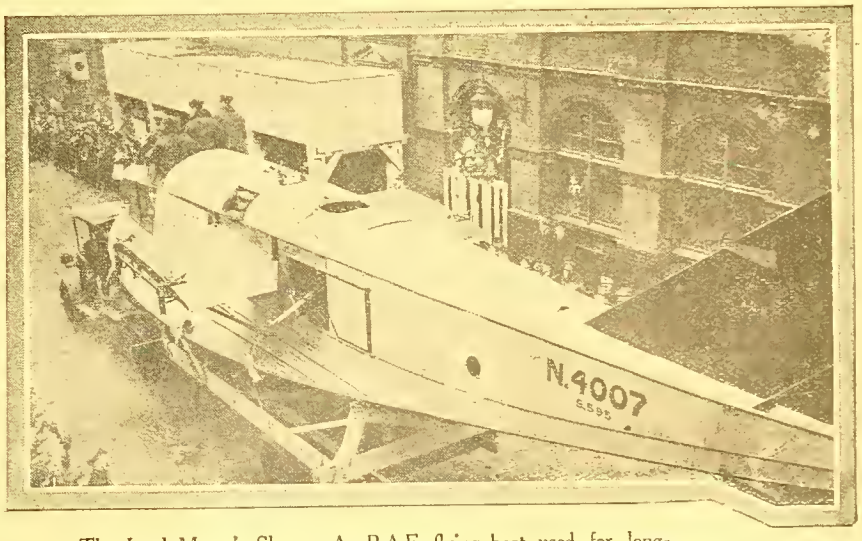
A Gallant British Airman.

Capt. F. M. F. West, M.C., R.A.F., has been awarded the V.C. for his outstanding bravery in aerial combat.

While engaging hostile troops at a low altitude far over the enemy lines, Capt. West was attacked by seven aircraft. Early in the engagement one of his legs was partially severed by an explosive bullet, and fell powerless into the controls, rendering the machine for the time unmanageable. Lifting his disabled leg, he regained control of his machine, and, although wounded in the other leg, he, with surpassing bravery and devotion to duty, manœuvred his machine so skilfully that his observer was enabled to get several good bursts into the enemy machines, which drove them away.

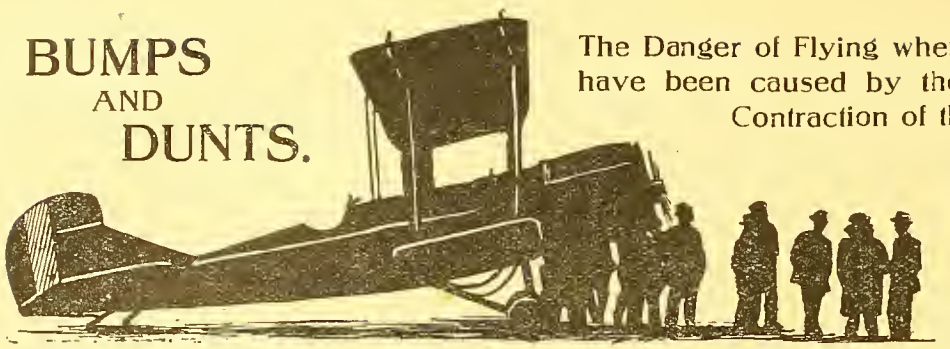
Capt. West then, with rare courage and determination, desperately wounded as he was, brought his machine over our lines and landed safely. Exhausted by his exertions, he fainted, but on regaining consciousness insisted on writing his report.



The Lord Mayor's Show. An R.A.F. flying boat used for long-distance flying.

BUMPS AND DUNTS.

The Danger of Flying when strong currents have been caused by the Expansion and Contraction of the Air.



COMMON or garden landsmen are well aware that the invisible atmosphere is often rent by violent horizontal commotions known as winds. But it is necessary to fly before the existence of corresponding vertical commotions becomes at all vivid or real. Nor are these vertical commotions due to the leaps and twists which the wind makes when diverted by obstacles, as some landsmen still fancy. It is, of course, true that a wind from the sea strikes upwards upon impact with a cliff, and that a patch of calm air can be found on the top of the cliff beneath the "bounce" of the wind. But no pukka "bump" occurs here. The pukka bump is due to a vertical current caused by the expansion and contraction of masses of air just as the horizontal winds are caused. The temperature of various terrestrial surfaces alters with their radiative and conductive qualities, and the movement of the air above each surface responds. Thus, a broad belt of coastline may include:

(1.) A strip of sea varying from shoal water to deep channels.

(2.) A strip of sand.

(3.) A strip of deep soil, covered with turf.

(4.) A high cliff with a thin veneer of earth above it.

The heat of the sun and the chill of night play alternately upon these four diverse strips of surface. Each strip heats up and cools down at a different rate. Evaporation affects each of them diversely. Ascending and descending columns of air, moving at all sorts of speeds, play invisibly over them, reaching their maxima, as a rule, during the daytime when the capricious sun begins to play fast and loose alike with temperatures and with evaporation. The word "bumpy" is loosely used by most flying men to cover all these vertical currents, though some pilots employ the word "dunt" to distinguish a downward current.

Cloud Bumps.

In addition, both "bumps" and "dunts" occur in connection with electrical discharges. In thundery weather bumps are excessively severe, and the vertical speed of the current may be equal to that of the fiercest horizontal gales. Bumps are often very pronounced when flying through clouds, though deponent is unaware whether cloud bumps are invariably electrical in origin or not. In any case, the unwary pilot who gets caught in a black thunder cloud is in for a regular dance of death.

Bumps vary in other respects than velocity. To judge by pure sensation, they vary in depth and in diameter. Some of the vertical currents seem no bigger than the top of a café table. A rising current of some such puny dimensions will get under the tail plane and make a 'bus stand on its nose; under a wing tip, and make the 'bus try to lie down on its side in the air; or under the nose, and so put a half-nelson on the fuselage. A few minutes later a bump of enormous area but sedate dignity will occur under the machine as a whole, and cause it to flop gently earthwards like a parachute. The next minute an invisible Titan will catch hold of the machine and chuck it half a mile, while the pilot's heart comes up into his mouth as he fights for control. Generally speaking, the bumps encountered on any single trip are of a fairly uniform character. You don't get the very little ones and the very big ones on one and the same day. The higher you climb, the smoother the air as a general rule, until you get into cloudland, where absolutely anything may happen. On one day a cloud feels like an extremely dilute and diffuse ice cream. It is very cold and clingingly wet, but it feels comfortably solid and stable to fly through. Half an hour later you pop into an apparently similar cloud, and instantly feel as if giant, impalpable ghosts were playing pitch and toss with you. There's no telling.

Early Perils.

Readers will remember that in the early days of flight crowds assembled at Brooklands or elsewhere and waited hours before a machine dared take the air. This reluctance was partially ascribable to the wind, which generally dropped towards sunset, but it was also due to bumps. The primitive aeroplane could not rise very high, and at low altitudes a severe bump might prove very dangerous. Moreover, air speeds were low and the margin of lift was small: a machine flew into a vertical air current and lacked sufficient impetus to carry it through: it crashed instantaneously. The modern machine is so fast that its impetus bears it clean through a vertical current encountered at low altitude, and it is once more attacking still air or horizontal currents before a crash can develop. The original pioneers, who experimented with engineless "gliders," were killed mostly by being caught in ascending air currents, which bore the glider to a fair height: the glider, having no engine, was unable to "charge through the bump": at the top of it he found himself in a dangerous position at an altitude high enough to be perilous, but too low to permit of a recovery, at any rate by a man with little experience on a machine with rudimentary controls. A man trapped in an upward bump, which slanted backwards, could hardly be expected to recover control under such circumstances. One of the Wrights saved himself in such a bump by getting the nose down very quickly and forcibly; other pilots may have essayed to do so, and merely succeeded in nose-diving down the bump.

TORQUE.

"ENGINES."

Some of the Uncertainties encountered in Aerial Warfare.

ONE hears so much in the Air Force of adventures with "Archie" and with Huns, that one is apt to forget that the pilot when over the lines has another ever present terror, and one that may have very serious consequences. This is his engine. At any time during a flight, taking off, hedge hopping on our own side of the lines, or miles over the enemy country on an offensive patrol, the engine may suddenly cut out, forcing the pilot to make an immediate landing. This, of course, is a greater worry to the long-distance bomber and the reconnaissance machine than it is to the scout or the artillery machine, for the latter rarely goes far over the line, and can usually manage to glide into our lines if the engine fails. It may crash in shell holes or some small field when trying to land, but the occupants usually escape unscathed.

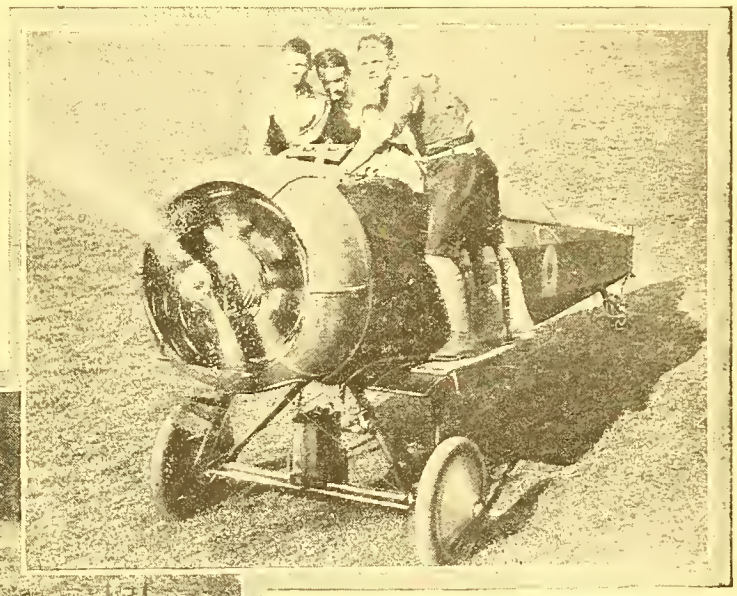
If an engine, however, chooses to cut out when a pilot is twenty or thirty miles behind Fritz's lines there is no alternative but to land in Hunland, burn the machine, and tamely give oneself up. As an example of this I will take an incident which happened when I was observing. It was in March, 1917, and ten of our machines escorted by ten scouts were to bomb a certain large railway siding some twenty-four miles behind the Flanders front.

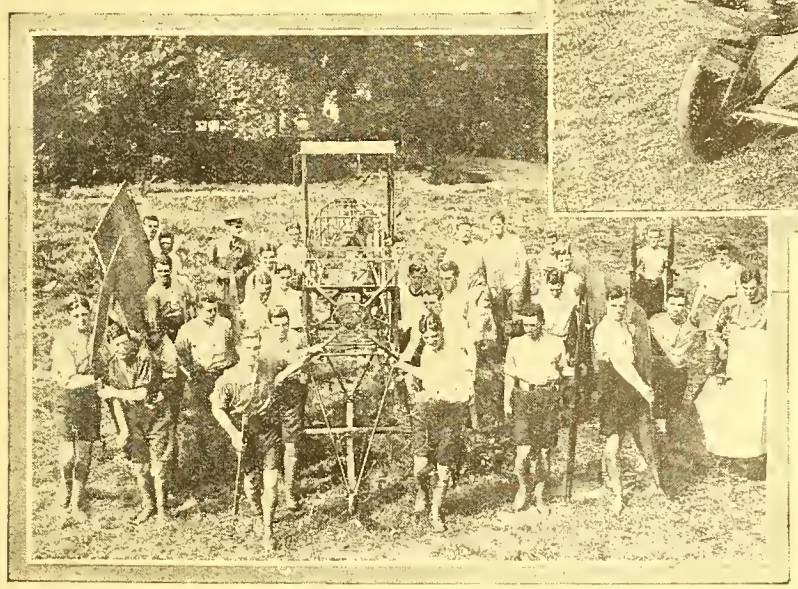
Our machines were the good old F.E.'s, fitted with a 275 h.p. Rolls-Royce, which is recognised in the aerial world as the most reliable engine made.

It was a beautifully clear calm day, and, owing to our escort of scouts, we reached the object with the greatest of ease, not a single Hun appearing to oppose us. Once there, we dived to a height of 6,000ft., turned, and dropped our "pills"—two 112 lb. bombs. I was in the leading machine and managed to watch them the whole way to the ground. I was just doing a little *pas seul* in the front seat, while the pilot was grinning all over his face, when, without warning, the engine stopped dead. After a hasty glance round his instruments to see that everything was in perfect order, and that the stoppage was not through his own negligence, the pilot put his stick hard forward so as to get the machine into a good dive and keep the propeller going, in case she should chance to pick up again.

I fired a green light to show the rest of the formation that our engine had "gone dud," so that they should not follow us down, and was just looking round to find a nice field to land in when, just as suddenly as it stopped one side of the engine, that is six of the twelve cylinders, burst into life again. We were now at a height of 3,000ft., but the power from the engine was just enough to keep us going nicely.

Surrounded by clouds of "Archies," with a dread fear in our hearts lest she should cut out again, we tore for the lines. We seemed to be nearly standing still, the ground passed so slowly. At last, however, jagged shell holes began to appear beneath us. These got more and more numerous, and a perfect orgie of machine gun fire was directed at us. The Boche second line was crossed, then the front line, over No Man's Land, and so into safe country. The engine which had done so much for us with its splutter, splutter, now gave a few spasmodic coughs and died away again. The pilot glanced down: No hope of it picking up this time; where on earth was he going to land? There's a field he might reach which is fairly clear of shell holes. After a moment of uncertainty, he knows he has enough height to reach it. He glides over, flattens out, and lands. H.W.S.





TRAINING A PILOT.
(Right) Cadets, by taxying about the aerodrome, can obtain knowledge of the engine controls without the risk of flying.
(Left) Instruction in rigging.

The A.C.U. and its Peace Programme.

Auto Cycle Union ready for the Resumption of Activities in the Motor Cycle World.

WHILE it is impossible at this date to give more than an outline of the possible scope of the Auto Cycle Union, it may be said that the "after-the-war" programme covers a wide field. While the cheers of the populace over the signing of the armistice were resounding all over London, we saw Mr. Loughborough, who detailed to us the many things the A.C.U. has done for motor cyclists and the nation during the war, and while we are sure every rider will appreciate the value of this good work, we think at the moment the future is of greater interest than retrospection. Hence our reason for first referring to peace plans.

The immediate object of the A.C.U. will be to secure the prompt removal of war-time restrictions and the restoration of all pre-war rights of the motor cyclist. The fuel question and that of the supply of motor cycles to the private user—new and ex-Service machines—will be closely watched. The Technical Department will be made an important feature. Here as before the war the examination of motor cycles for prospective purchasers is undertaken, as are also the provision of technical advice and information, "certified trials," and tests of new inventions. It is proposed to add a library of makers' catalogues available for reference at the offices or by correspondence, also to institute the appointment of motor cycle schools and to hold examinations for driving certificates. The list of recommended hotels and repairers will be much enlarged, and additional travelling representatives appointed to supervise them. Local representatives or consuls will also be appointed in each district, and there are other projects under discussion.

The difficult question of our road surfaces which is bound up with that of taxation is already receiving special attention. It is proposed to establish in each and all of our Overseas Dominions a union of local motor cycling clubs federated to the A.C.U., working in sympathy with the home body as regards competitions and reciprocal benefits to tourists. Competitions at home will again become an important branch of the Union's work, and it is confidently anticipated that a Tourist Trophy Race will be held, if not next year, then certainly in 1920.

THE UNION AND ITS WORK.

The many new readers of *The Motor Cycle*, no donbt, will be interested to know more about the A.C.U., what it is and what it has done, and for their benefit, chiefly, we give a brief history.

The Auto Cycle Union was founded in 1903 by a few enthusiastic motor cyclists as a branch of the Royal Automobile Club to protect the interests of motor cyclists and to encourage the sport and pastime. It is a national organisation. It is not only a union of the motor cycle clubs throughout the country, but has an even larger membership of private owners.

The president of the Auto Cycle Union is the Hon. Sir Arthur Stanley, K.B.E., C.B., C.V.O., M.P., the popular chairman of the Royal Automobile Club, and president of the British Red Cross Society. Amongst the vice-presidents are such well-known gentlemen as Mr. S. F. Edge, General Sir H. C. L. Holden, K.C.B., Colonel F. Lindsay Lloyd, and Mr. J. R. Nisbet. Mr. Nisbet is also the chairman of the committee.

Its Construction.

The Auto Cycle Union is governed by a committee of forty-four members, elected annually in March; twelve of these are nominated by the R.A.C., twelve are elected by the private members, and the remaining twenty by the affiliated clubs. It will thus be seen that the constitution of the A.C.U. is an exceedingly democratic one.

In the past the Auto Cycle Union has fought and won many battles for the private motor cyclist. It has also had to fight the trade on more than one occasion in its determination to continue a policy of imposing increasingly severe tests on motor cycles in its open competitions, such as the Tourist Trophy Races and the Six Days' Trials.

The excellence of the British motor cycle and the valuable military asset it has proved to this country is largely the result of such a policy in the past.

Road Guides.

In the early years of its existence the A.C.U. did much useful work. The A.C.U. Road Guides' Scheme was introduced in 1912, and large additions made to the numbers of appointed hotels and repairers. The Government recommendations to increase the scale of taxation on motor cycles were successfully fought. It was in this year that the valuable Silencer Trials were held, and action was taken with reference to misleading trade advertisements. During 1913 much good work was done at the War Office in connection with military motor cycling.

The outbreak of the Great War, now happily ended, was a severe blow to the A.C.U. It was emerging from a somewhat weak into a very strong position. It is now to the interests of motor cyclists to give it all the support they can in order to place it in its pre-war position.

Mr. T. W. Loughborough, engineer and motor cyclist; secretary of the A.C.U. since 1912; general secretary of the F.I.C.M. (the International Federation of Motor Cyclists); member of the War Office Advisory Committee on Motor Cycles from 1912 to date; and an associate of the Institution of Automobile Engineers.

The Messenger Service.

The war did not, however, restrict the Union's activities, and its staff and offices immediately were placed at the disposal of the London District Reserve Committee for the recruiting of motor cyclists. This work was continued throughout 1915, and early in the following year the head offices of the Union became the central office for all the Motor Cyclist Reserve Committees in the country. A total number of 11,576 applications for enlistment were dealt with by the A.C.U.

The taxation of motor cycles proposed by the Government in April, 1916, called for energetic action, and the suggestion of the A.C.U. that any increased taxation should be in the form of a war tax on petrol was adopted by the Government in its entirety, which was to the advantage of motor cyclists generally.

In November, 1917, the Union was asked to undertake the organisation and control of an important despatch service between various Government Departments in London. This service proved to be most valuable, and 153,928 miles have been driven by the A.C.U. messenger detachment.

During the last two years the various Orders that have been issued under D.O.R.A. have caused difficulties to hundreds of motor cyclists. The A.C.U. has been asked for advice in over 3,000 individual cases, the majority of such applications being in connection with the supply of petrol, and in a very large number of these the Union has succeeded in obtaining a licence for the applicant. Help in obtaining calcium carbide, priority certificates for repairs and new machines, and export licences have been successfully given.

COMPETITIONS AND THE PUBLIC.

THE TESTING OF NEW PEACE MODELS ON ROAD, TRACK, AND BENCH.

By "ROAD RIDER."

The element of luck in competitions. As "Road Rider" points out, a great deal depends upon the quality of "the riders in front." The best possible machine and rider can be robbed of their award through being baulked by another competitor.

COMPETITIONS naturally serve a variety of purposes. They teach the trade much—few machines emerge from a Six Days Trial without its sponsors making a few mental notes. They form a training school for expert riders. They give new designs an opportunity of laying the foundations of a reputation. They advertise the sport and its pleasures. They suggest tours to the minds of timid potterers, and so benefit the hotel keeper. But to my mind the *main* purpose of trials is to inform the buying public (1) what motor cycles can do, and (2) which motor cycles are the best.

On this basis, our post-war trials must be utterly different from all their predecessors. The 3½ h.p. solo mount is no longer a dark horse. We knew in 1914 that the leading examples were good enough for anything: Flanders, Salonica, Palestine, and Mesopotamia have hammered this ancient knowledge home. So far as (1) goes, the 3½ h.p. solo is not wanted in the first post-war Six Days. So far as (2) goes, no Six Days can tell us which 3½ h.p. solos are the best of their class, as 1,000 miles is no test of durability for an established type, and the awards take little or no account of whether a machine is comfortable, or of how much handling it wants. Moreover, these trials were by 1914 becoming too big and almost unmanageable. On all grounds except one the time has come to bar the 500 c.c. solo mount clean out of the six days.

Official Bench Tests?

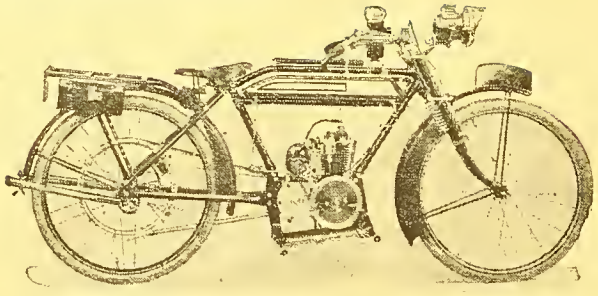
The exceptional ground is that the public want to know if their old favourites are as good as ever, and how some of the newcomers compare with them. For example, is the 1919 Triumph very much better than the 1914? How does the 1919 A.B.C. compare with it? And so on. Frankly, no Six Days can answer these questions. We might as well compare two rival taxicab chassis on the basis of six days' work in London. Nevertheless, the makers of the 3½ h.p. machines want a chance to advertise, and the public desire information. What can be done? Brooklands? Tourist Trophies? Hill-climbs? These supply speed information about specially tuned or specially built 'buses handled by super-experts. We are all curious about the calibre of, *e.g.*, the new Raleigh flat twin. It may be a thundering good 'bus, and yet its designer may be helpless at building an engine for a flying mile, and the staff may not include a brilliant trackster. Let the A.C.U. step in and compose a programme of optional technical tests, resembling the Government acceptance tests of an aircraft engine — power, wear, fuel, and oil consumption, adjustments during twenty-five hours on the bench, etc. One of these tests will give the public more and better information than any Six Days, and would offer the firm concerned a better advertisement. The big twins might receive similar treatment.

Four types of motor cycle still require the most searching test and the widest possible advertisement *on the road*. In order of urgency they are—

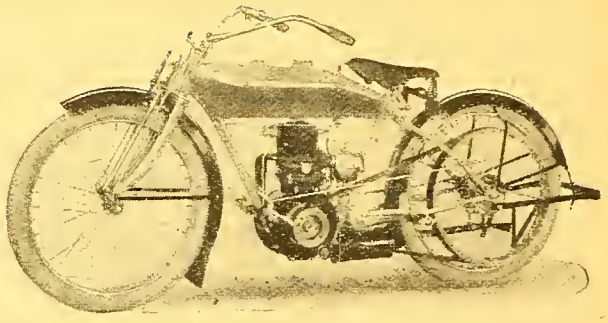
(i.) Lightweights.
(ii.) Cycle cars.
(iii.) Sidecars.
(iv.) Two-strokes (irrespective of h.p. or chassis).

I put lightweights first, because *cheap* machines will be in special demand whilst we are paying our war debts; cycle cars second, because few of them have ever been roadworthy; sidecars third, because their frames break, and because we still need information as to whether 3½ h.p. is adequate; two-strokes last, because we hope that some day they will suit us better than four-strokes.

Competitions and the Public.—



The lightweight which "Road Rider" suggests should be one of four types to be encouraged in future trials.



The two-stroke—a type with large engine unknown in this country, which may "come along" if two-strokes are encouraged.

In plumping for an annual Six Days strictly limited to the above four types, I by no means imply a return to the old *régime*.

Suggestions.

The most urgent reform is the stiffening up of the A.C.U., so that it shall really be a governing body and cease to kowtow to the trade. Outwardly and formally independent, it has never forgotten that it must secure entries—a lot of entries—to make its trials pay. Its next trial is sure of a colossal entry. Let it seize the opportunity, organise a real trial, and learn that riders will respect courage and independence.

In the first place, the entry of each make should be *limited*, and to as low a maximum as possible; if a maker cannot trust *one* machine to represent him in a 1,000 mile trial he does not deserve an advertisement.

In the second place, *the A.C.U should eliminate trade riders*. Machines sold to the public are ridden by the public at their own risk. In a Six Day Trial the riders should be amateurs, allotted their mounts by ballot to avoid masquerades.

In the third place, *freak precipices should be eliminated from the route*. They test the riders, not the mounts. for any modern machine can climb any road if it is geared low enough Moreover, success on such climbs as Litton Slack often hinges on whether you reach the hill first or hundred and first, and whether you have a crack soloist or a dud sidecarist next ahead of you.

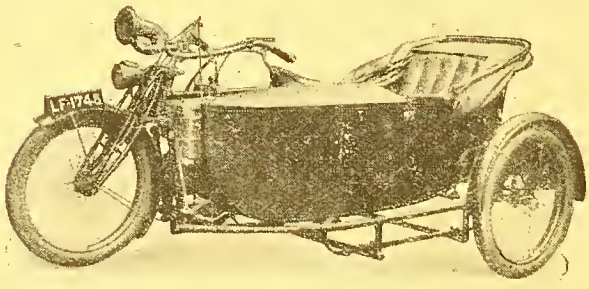
In the fourth place, a fearless and frank report of the *condition* in which a machine finishes might become the most valuable feature of the trials, provided the examining staff was efficient and the entry not unwieldy.

All these reforms are of an obvious and clamorous nature. Another of the same type is more difficult to execute. Tyre troubles, as we all know, are a lottery: but, as schedules are (justifiably) stiffened up, a tyre stop may penalise a machine quite unfairly. I am an old competition hand, and, even if I include the prehistoric days, tyres have given me more anxiety than all the rest of the machine put together. Two tyre stops on a ten-mile sector often sound the knell of a "gold." The problem, though thorny, is not insoluble. Every rider in the long procession can hand a "tyre stoppage card" to one of the passing riders to be delivered at the next control. At the night stop his claim is checked by actual inspection of the inner tube.

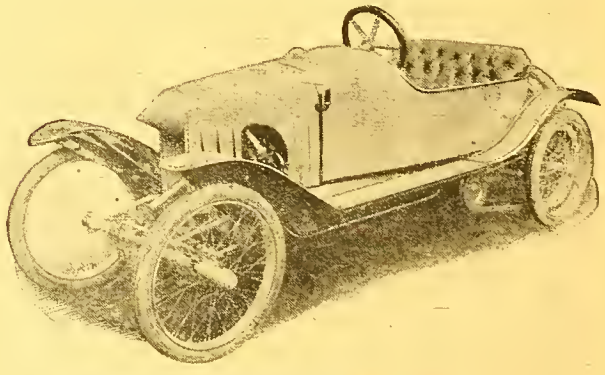
Comfort and Cleanliness.

Various new factors require consideration. Comfort is, perhaps, the chief hall mark of a super-machine. If the A.C.U. cannot invent an oscillometer with which precise comparative tests of 100 machines can be quickly made, is there in the country no man so honest and trustworthy that his personal report cannot be accepted? It is only necessary for him to ride each machine over a specially prepared track of 100 yards: he could work through the lot in an hour, and for the present the classification need not be more precise than "good," "fair," and "bad."

Cleanliness is also vital. It includes *keeping* clean and *making* clean. This item used to be glossed over by allowing us to carry rags, Selvyt, and metal polish in our lamps, and play the housemaid outside each control. I hope that in the next trial each machine



The passenger machine, *i.e.*, sidecar, which our contributor maintains needs trials to develop it.



The cycle car—another type of passenger vehicle

Competitions and the Public.—

will be ridden over a specially prepared layer of mud, handed over to officials, garaged, and judged. After marks have been allotted, the competitors are admitted, and allowed ten minutes—not more—to clean down their mounts. Then auxiliary marks for ease of cleaning are awarded.

Price and Performance.

The vexed question of cost is more thorny to handle. It is clear that, if one 3½ h.p. machine costs £75, and is no better than a rival at £50, *the* trial of the season should take cognisance of the absurdity. At the same time it would be fatal to place a £35 machine which scrabbled through above a £60 machine, which behaved decently and finished with lots of running in it. Moreover, the consumption of fuel is a serious point nowadays, and machines which can run satisfactorily on cheap, heavy fuels deserve a public reward. This item can be tackled along the lines of awarding good premium marks for each £5 by which the price falls below a standard in each class, and taking those marks off again for a bad performance or for bad condition at the finish. Fuel consumption can figure separately. The price of petrol will ensure its receiving full attention from intending buyers.

Are Speed Records of Value?

Speed, let us frankly admit it, has been grossly exaggerated as an item of interest. The hour record is only of indirect significance for nine buyers out of ten. It shows that the holding firm possesses brains, and can build an engine to last. It is also an event of much sporting interest. But the P. and M. wooed the buying public and the Government whilst ignoring Brooklands utterly. In no future Six Days Trial do we want any speed test, except some such stunt as, *e.g.*,

(1.) A climb of Sunrising at 25 m.p.h. *on the last day but one.*

(2.) Five miles on Brooklands at 40 m.p.h. *on the last day.*

In neither case would any opportunity for tuning up be allowed.

War-worn Machines: A Suggestion.

When and How will the Army Motor Cycles be Sold?

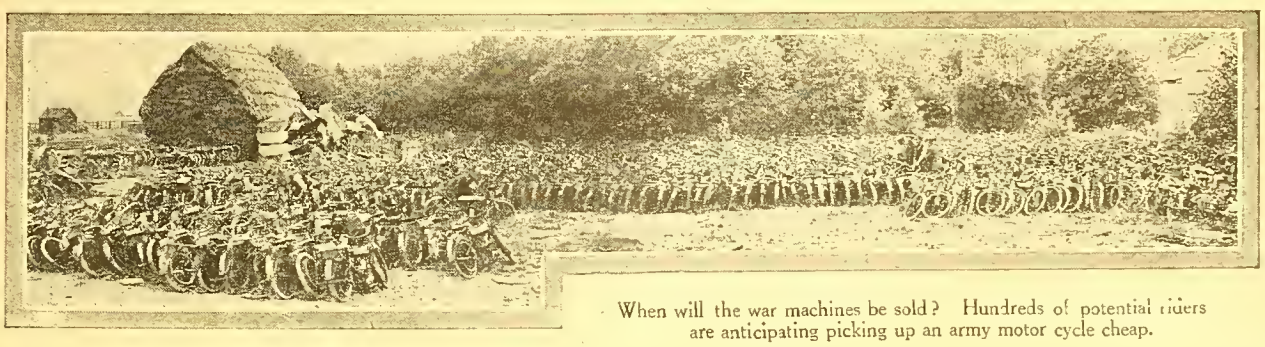
WHILE the majority of motor cycle manufacturers are in such a position that they can change over on to their normal products within a few weeks, no doubt there are several firms not in such a favourable position. Some makers were compelled to sell most of their machinery to the Government, and have been engaged upon work of an entirely different nature from the production of motor cycles. These concerns may require twelve months to reorganise, and in the meantime will not be able to produce their former goods in any quantity.

It has been suggested to us by one well-known maker in this position that the Government places in their hands the rebuilding of war-worn motor cycles. Large stocks of spare parts are held by the Government, and it may not be necessary for the contractor to do more than take down, re-enamel, and replate the frame, forks, etc., and replace worn parts. It is such work as this that firms with very little machinery could undertake and accomplish in a satisfactory manner; the idea may be welcomed by the actual makers of the W.D. machines, who then would be in a position to go right ahead with their new programmes without being hampered by having to reconstruct machines which have once been sold.

Should the rebuilding and overhauling of war-worn machines be placed in the hands of the makers, an arrangement might be arrived at for the less fortunate concerns to do this work under contract.

Such a plan appears to have many advantages, and may suggest disadvantages also, but it appears to us to be one of those cases which offer an opportunity for the various members of the trade to help one another and so lay the foundations of that closer relationship between those who make up an industry, which is so very desirable at a time when co-operation has been proved to be so valuable.

There have been so many scandals in the past concerning the sale of war materials; it is not anticipated that the war-worn and surplus Government motor cycles which will be sold will be really remarkable value. No doubt there are many would-be motor cyclists who hope to pick up an ex-W.D. machine for a mere song, and we think they are doomed to disappointment. The disposal of Government motor cycles presents a big problem, and it is not yet known in what way this will be done, but it is tolerably certain that the War Office will retain all new machines and probably the best of those that have seen service at least for another twelve months.



When will the war machines be sold? Hundreds of potential riders are anticipating picking up an army motor cycle cheap.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, 'The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

THE SALE OF ARMY MOTOR CYCLES.

Sir,—I have met many despatch riders who are of the opinion that D.R.'s machines will be offered for sale to the men who have been riding them in France.

Would it be possible to place a suggestion to that effect in front of the Reconstruction Committees for their consideration? A. DEWBERRY.

[This, amongst other suggestions, has already been put forward.—ED.]

A WARNING.

Sir,—The advantage of the old, old rule of looking over your motor cycle occasionally for loose nuts, bolts, etc., was brought home to me very strongly not long ago. I have an 8 h.p. Jap-Sunbeam outfit. This is fitted with spare wheel, which is interchangeable with both sidecar and cycle wheels. These are made to drop out by taking out two bolts. A rear wheel bolt working loose allowed the wheel to jump out of the dogs of the driving chain wheel. The road was blocked with traffic, and the brake had no effect whatever—result £10 damage to sidecar. The brake merely stopped the chain, and failed to lock the back wheel, as it was temporarily running out of mesh with the driving chain wheel. Obviously, there might very easily have been a bad accident. LOOK TO YOUR BOLTS.

London.

A MANUFACTURER'S APPEAL.

Sir,—I have received so many indications that the motor cycling public expect an immediate resumption of deliveries that I ask you to spare me a little of your space for these remarks.

The British Army is still in being and in the field. An army in the field requires mechanical transport. The transport requirements of an army on the move vary very little whether it is fighting or not, and those requirements will have to be met for some time yet. May I therefore beg your readers to exercise their patience for a little longer, and remember that the English manufacturer is longing to be free again and re-enter the world's markets with all the vigour of four years' bottled up enthusiasm. Let us see the job right through, and we will serve you all the better.

PHELON AND MOORE, LTD.
B. MARIANS.

WAR PETROL AND KNOCKING.

Sir,—I am writing a line for the benefit of all who are riding at the present time. My machine, a 1916 Harley and sidecar, had a very bad knock—a real pre-ignition knock.

I altered the ignition; retarded it first on one cylinder and then on the other without any good resulting. I also fitted new little ends and new pins, and also another cylinder to the front. I tried all different plugs and oil, but still got no better result. I use my machine every day, and could make it knock within three minutes of starting. I might add that the clearance between the cylinder and the pistons was two-thousandth of an inch—absolutely perfect. Every day I met Harley riders and others, and they all complained about their machines knocking. At last, as a final resource, I tried the only tin of pre-war petrol I had, and doing my level best, after one hour's hard running, it was impossible to produce a knock of any kind. The engine kept cooler and ran with greater flexibility, but as soon as I used the war spirit again the knock showed itself at once.

I should like you to publish this for the benefit of all, as I know several people who are pulling their machines to pieces and wasting no end of time trying to find out the cause of this knock, which, I guarantee by actual proof, is petrol. I was going to sell my machine, but I shall now keep it until we get the real petrol again, when I know the knock will disappear. G. K. GIBBS.

WANTED, A NON-RUSTING FINISH.

Sir,—"Interested" (Birmingham) writes in your issue of November 14th suggesting the galvanising of all steel parts. He, however, says he does not know whether it has been tried previously.

He has not read *The Motor Cycle* for long or consistently, otherwise he would know that the galvanising process for cycle and motor parts is old, and has been tried over and over again, notably by a Leicester firm, who advocated cold galvanising as apart from the hot method. However, galvanising is not all honey, because during the process there are numerous slight defects thrown up in the form of little pimples or spots, which give any polished metal work on a motor cycle or bicycle a very rough appearance. Galvanised work also tarnishes, and does not look very smart when finished. G.W.

Coventry.

A SUITABLE MOUNT.

Sir,—Seeing that there is some probability of getting a holiday *and* some petrol next season, the question of a suitable mount arises. There are two of us, but we barely turn the scale at 20 stone the brace. We should carry, say, 50 lb. of luggage, and we want enough power to be sure of topping the Kirkstone Pass or anything worse (if possible) that may be found on the motor roads in the Pyrenees.

My own idea is an 8 h.p. sidecar outfit, with three-speed countershaft, but my engineer says that any air-cooled engine would overheat itself on the long steep climbs among high mountains.

Expert opinion is not to be ignored, but practical experience is safer, and I hope that something useful will result in consequence of this letter. MONTE SOME MORE.

Mitcham.

[There are many air-cooled motor cycles which would answer our correspondent's requirement most satisfactorily. —ED.]

STANDARDISED FRAMES.

Sir,—First, I wish to acknowledge the pleasure and information derived from receiving your journal regularly during two years campaigning in Sinai and Palestine. Secondly, I would like to ask you or any of your readers what has become of the Scott scheme of standardising the manufacture of narrow diameter steel tubes for building up motor cycle and cycle car frames? I remember the scheme essentially consisted of turning out a number of different lengths, each end being flattened and drilled, the joints being clamped together by special bolts and spherical washers, covered by neat aluminium "push on" covers.

The scheme seemed to me eminently desirable, eliminating all brazed joints, and cheapening manufacture. The motor cycle frames would be built up, of course, on the duplicate tube principle, properly triangulated. It would probably be advisable for the firm producing these to issue with each order a small pamphlet on triangulation with sample illustrations, to ensure that all members should be not subjected to other than pure compressional and tensional stresses.

R. M. WIGG.

A CURIOUS CASE.

Sir,—As a reader of your paper, I should like to give an explanation to Mr. H. C. Cousins, R.M.A., who wrote "A Curious Case," published in your issue of May 16th. I am afraid it is rather a long time back, but we in "Mespot" are rather behind the times in receiving papers, etc.

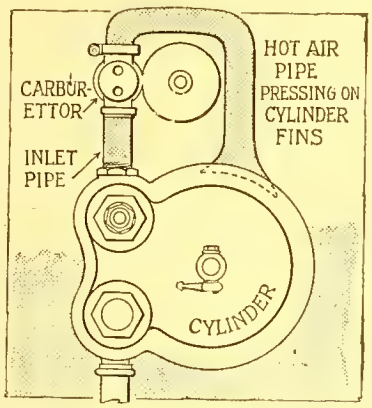
Mr. Cousins states the machine was a 2¾ h.p. flat twin with Thomson-Bennett magneto, which fired evenly whilst minus a carbon brush. I presume he refers to a Douglas, and, if so, I can cite a similar occurrence. While on a run, when some miles from anywhere my 'bus gave trouble. This I found to be caused through a dirty collector ring, and took out both brushes while cleaning it. When I was about to return them I found, to my dismay, that one of the carbon brushes had slipped from its spring holder and was lost in the sand, the spring remaining. Not wishing a "night out," I thought how I might effect a temporary repair. I stretched the spring till one end was touching the high-tension wire and the other projecting about ⅛in. I replaced the holder, and the 'bus gave no further trouble for the rest of the run. I hope this may be of interest.

Since then I have had a touch of heat stroke, followed by further illness, but hope soon to be back with the boys, where the "Blue 'Un" is welcomed each mail by us all. I had some copies forwarded to me in "dock," and they have cheered all who take any interest in the sport, and have made a tour of the ward. D.R.

Mesopotamia.

A VACUUM AFT OF THE CYLINDER.

Sir,—May I be allowed once more to refer to "Road Rider's" air-cooling article and "Ixion's" comments thereon? "Ixion" points out that the carburetter intake is usually outside the vacuum cone at the rear of the cylinder, and both he and "Road Rider"—the latter in a private letter—draw the analogy of the back draught in a car. But the carburetter mentioned in my letter has a hot air pipe, and draws the air from the centre of the rear of the cylinder, the end of the pipe pressing against the fins. Now, sir, it seems to be the logical conclusion that this is quite the simplest method of cooling the back of the cylinder, for the 10,000 feet per minute suction (mentioned on August 22nd by "Ixion") must cause quite a healthy draught to impinge on the rear fins. Therefore if anyone suffers from an overheated cylinder, let him fit a hot air pipe, and find immediate relief!



The hot air pipe as suggested by the Rev. J. M. Philpott.

With reference to Dr. Lindsay's article on the Binks carburetter, I have used the instrument for about the same time, and can corroborate his statements in every detail, but I have one other point of disagreement with Mr. Binks. He declares that the bottom air holes have no effect until the main jet starts to open—and that is theoretically true—but seal those holes hermetically, *e.g.*, with soap, and I have always found that running on the two pilots is almost impossible, so that actually they always operate to some extent. (Rev.) J. M. PHILPOTT.

AN OLD MARKET—INFLATED.

Sir,—As an elderly rider (my first cycle was an Otto, see the B.S.A. advt.), I was much interested in your article of October 24th, for I have long been convinced that there would be a large demand for such a vehicle as you describe if it were designed after careful study of the needs of the class to whom you allude, whose needs have hitherto been ignored, and were advertised not merely in the motor cycling journals, but in journals generally seen by such class.

I am not altogether without experience on this subject, for, some years before the war, I converted an old De Dion tricycle into a very satisfactory motor bath chair by replacing the original frame by a drop frame which admitted of a foot board and seat (from which the engine could be started), and altering the cycle bar into a tiller.

It was rather heavy, but answered very well, and I had many enquiries as to where such a machine could be obtained.

I gave this away, and now have a 2¾ h.p. Douglas, to which I have fitted a cane sidecar of the old high pattern, and have transferred the controls to this, so that the right hand, while resting on the elbow, has under its fingers the brake lever and the three engine controls, while the horn, the gear lever, and the starting handle are within a few inches; and the left hand, resting on the thigh, holds the tiller, on to which is the clutch lever. The front wheel brake is worked by the right foot, and this machine is a great improvement on the De Dion.

You must allow me to differ from you as to the suitability of the motor cycle for this particular job.

Even the lightest motor cycle is rather a handful to wheel about—for an elderly man. It cannot afford a really comfortable, still less a well-protected, seat, and its capacity for carrying parcels is, in this case, practically nil.

I am sure that only a tricycle, in one of its many forms, will fill the bill, and of these forms the three best known are, first, that which drives the two rear wheels, *e.g.*, the De Dion; secondly, that which drives the single rear wheel, *e.g.*, the Morgan; and thirdly, the sidecar.

Of these the first two have the drawbacks of making three tracks (balanced by comparative freedom from punctures) and of much of the mechanism being beneath the seat, and therefore rather difficult of access.

The sidecar type seems to me by far the best for this purpose, for it makes only two tracks, the mechanism is quite separate from the seat, which can be made as luxurious as desired, can be used by either sex, or even if, as in my case, lameness be added to advancing years, for it is extremely easy of access. There is ample room for parcels: *e.g.*, in my Douglas I have fitted a box 15in. long to the saddle tube and the front edge of the carrier, which is thus free for parcels—the last I carried was a small fig tree. This box I find very handy, as it can be opened while one is seated.

The machine which I believe would be *it* would be a Scott Sociable made as a single-seater (for the vehicle under discussion would seldom be used for two persons), which would be lighter, and I presume cheaper, for a smaller engine might be used and no through axle, and the narrower track would be a convenience.

If this were obtainable I should certainly order one, as would probably several of my friends; and I hope that Mr. Scott will say something on the subject.

As to requirements, this machine would be chiefly used for frequent short and sometimes interrupted trips at a moderate and often quite low speed, not like the young man's bicycle for long and speedy journeys—in fact, I venture to say that it would seldom be driven at more than 15 m.p.h. or so.

I think, therefore, that Ford's example should be followed, *i.e.*, a powerful engine, a moderate top gear, and a low gear that would stick at nothing. For it is more comfortable to drive with the throttle than the gear lever, and it is vital that the motor cycle for an elderly person should keep going under all conditions, as he will often have to tackle bad roads and steep grades that cannot be rushed—*e.g.*, the houses of three of my neighbours have drives of 1 in 12 and 1 in 10.

The seat must not be of the bassinette type, beloved of the sporting youth, for old joints often find difficulty in sitting down on, and still more in rising up from, a very low seat.

I have used both wheel and tiller, and consider that the latter, if properly designed, would be the better for this machine, for it is simpler, and therefore cheaper, has no backlash (for it has at most only one joint), is very quick at steering, and can be lifted quite out of the way for mounting—a great convenience, especially if the rider has a "pronounced" figure.

A sprag should be fitted, as it is a most useful adjunct for a single-seater. I use, on the Douglas, the front wheel stand, which answers perfectly, and has more than once been of great service. A folding stand should be fitted to the side wheel. THE WHITE KNIGHT

Fleet, Hants.

Armistice Day. R.A.F. lady motor cyclists put their P. and M. sidecar to strenuous use.

HANDLE-BARS.

Sir,—I see in your issue for November 7th "Besquand's" views on handle-bars. I think that the type of handle-bars one first gets used to one always likes best. For instance, I got used to semi-T.T. bars first for touring, and find that they are absolutely *it*. I agree with your correspondent in the fact that the first time I went for a tour of over a hundred miles I did get a bit of a wrist ache, but it soon wore off. But when I did a fairly long tour on touring bars I got such a back ache that I could not ride with comfort for about a week.

I entirely agree with "Besquand" about footboards, but I think that adjustable footboards to suit one's riding position are a very useful accessory. The average man of over 6ft. on a baby lightweight with non-adjustable footboards rather resembles a curled-up porcupine. R.N.

THE COMING CYCLE CAR.

Sir,—The letter of Mr. A. G. Fenn *re* the above must be amusing to those designers who are experimenting to produce the *true* cycle car. He has apparently lost sight of the fact that these efforts are to evolve a vehicle that is a cycle car and *not* a super-light car. The tendency in the past has been to modify the motor car by fitting an obviously underpowered engine into an obviously unsuitable body, but Mr. Fenn should discriminate and not ridicule a type that is unconventional because it is true to its name.

A true cycle car should possess the following points :

(1.) Be capable of carrying two or three persons wherever a combination would go.

(2.) Have ample accommodation and protection from the elements.

(3.) Should require no greater power than the motor cycle and sidecar.

(4.) Should be as light and as economical in every way as the combination.

(5.) And should cost no more.

All that and nothing more is required of it—the covering of these points successfully is left to the designers—has it ever been accomplished? With regard to the reference to aeroplane construction, facts refute Mr. Fenn's statements: he evidently has had no experience with *cycle* cars or aeroplanes.

The Gibbons cycle car, built in 1914 and illustrated in these pages, was built upon purely aeroplane principles, but not the type Mr. Fenn refers to—there are fuselages *and* fuselages! It was lighter than any combination, had only a 3½ h.p. engine, yet was capable of 40 m.p.h., but during the 3,000 mile test that was given it it neither landed its designer in Bedlam nor the hospital!

That was in 1914. In 1919, with a still lighter body, higher power, improved springing, better accommodation, and an infinitely variable gear, the Gibbons cycle car, we hope, will prove the medium of converting your apparently dubious correspondent.

THE GIBBONS CYCLE CAR CO.
E. A. SISSONS.

BRITISH AND AMERICAN SIDECAR MODELS.

Sir,—With reference to "Sporting Tourist's" letter in your issue of the 7th inst. *re* British and American sidecar models, it is a surprise to me that he cannot find a British manufacturer who turns out a complete machine, including engine, from his own works. Is not the post-war Clyno such an outfit (provided your correspondent excludes tyres, saddle, magneto, and carburetter, which I do not think are manufactured by any of the American motor cycle concerns at their own works)?

The post-war Clyno, with an 8 h.p. engine, detachable cylinder heads and interchangeable wheels, is a machine, according to the manufacturers' specification, which, I think, will compare favourably with any American combination as regards durability, efficiency, and accessibility. Where is the American machine with interchangeable wheels which can be changed without disturbing the transmission? Also, from which can the cylinders be removed without dropping the engine (Excelsior with detachable bottom tube excepted), and where is the one which will outlive the British machine? I do not think there is any American which will stand the amount of running the British machine does without showing excessive wear.

"Sporting Tourist" wants a machine to take three or four persons including the driver. I do not think any motor cycle is constructed for the purpose of carrying three passengers and driver, but with a two-seated sidecar and pillion seat this is an easy matter with such machines as the Clyno and A.J.S. (two British machines turned out complete at the works of the respective concerns). Can any American compare with the above machines at the same horse-power, 5-6, as sidecar machines, as regards durability, efficiency, and accessibility.

I am the owner of a 1914 5-6 h.p. Clyno combination, with which I went from Liverpool to Thornton Rust, Yorkshire, in 1915; total combined weight, 8½ cwt. All hills were taken with ease. While in Yorkshire the majority of the riding was done with a passenger on the carrier, the combined weight being 29 stone, such hills as Cubeck and Worton Hill between Thornton Rust and Askrigg, Watson Bank between West Burton and Aysgarth, being taken with ease, which speaks well for the Clyno 1914 model. (Usual disclaimer regarding Clyno Engineering Co.) My machine is now in pieces after 7,000 miles, and I think it would do some of the American enthusiasts good to see the condition of the engine, gear box, etc.

In conclusion, I think it behoves all Britishers to encourage home industries—a lesson one and all should have learnt through the war. JOHN FAIRBROTHER.

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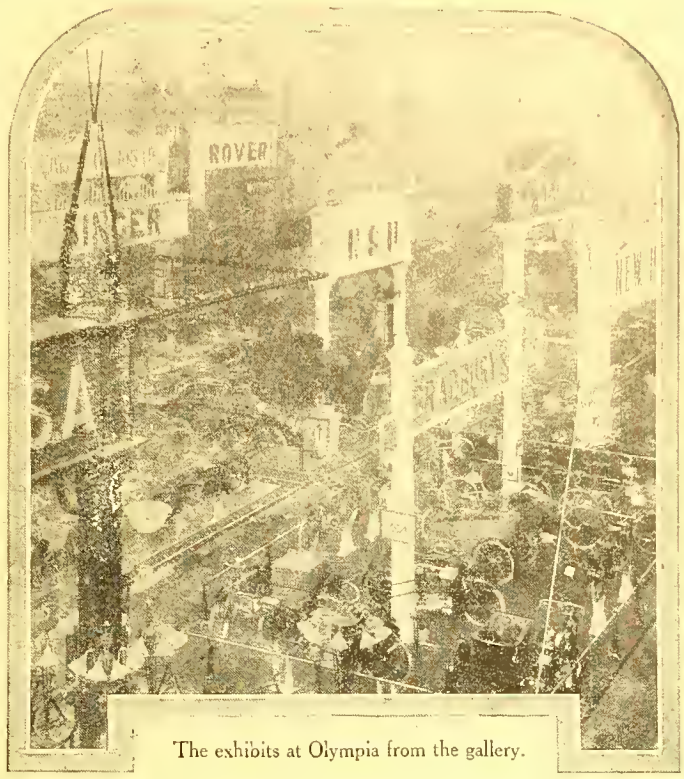
OLYMPIA.

An Ex-publicity Manager's Random Recollections of "The Show."

NOVEMBER fogs and greasy streets serve to remind one that this is the month of "the show"—the season in past years of anxiety, bad tempers, and fresh paint.

In pre-war days factories were working at high pressure to produce show models with their extra deposits of plate, their several more coats of enamel, and their specially finished engines, which pessimists prophesied would be late.

Harassed advertising managers were telephoning and telegraphing their printers concerning the "literature" so beloved of the catalogue fiend. There were errors to correct, alterations to be made to specifications, illustrations to be substituted. In several cases illustrations were mere "fakes." They were drawn up productions from blue prints and imagination before the machines were on their wheels.



The exhibits at Olympia from the gallery.

I always sympathised with the foremen in those days of rush and disorder. Interested members of the staff, passing through the shop, never failed to pause to admire the latest baby of the works. They got in the way of the men who with flashing eyes would telegraph by wireless all the bad things they had taken a lifetime to learn. Every visitor to the managing director was brought by that magnate to see the new model. With one foot on the erecting stand he would stand around discussing things in general, while the foreman, metaphorically, tore his hair.

Then, having held up the work for one golden hour, the mighty man would turn to the foreman. "You will never get it done in time," he would say in a very wise manner, and then transfer himself and his friend to another model, while the foreman, red in the face, would find a quiet corner where he could express himself adequately and without restraint.

The Eleventh Hour.

They were worrying times, yet there is not a man who went through them but who would go through them again—and perhaps he will, in 1919 or the year following. One can never tell.

The last stages of the work at the factory and the first efforts at Olympia overlapped. While mechanics were discovering that the gear box was half an inch too large and those directly concerned were endeavouring to shift the responsibility for the error from themselves, some members of the selling staff would be in London, suffering with a cold. It seemed impossible that an Olympia motor cycle show could ever grow in that great draughty building, which looked like a railway station and smelt like a circus. The first impressions were depressing, but there was work to be done. One became a little panic-stricken when it was remembered how much there was to be accomplished in a few days.

Then came a man hunt. Everyone seemed to join in the chase, and an element of excitement was introduced. In the old Stanley show days it was Mr. Lamb we hunted; later, at Olympia, the hunted one was Mr. Bednell, whose patience and forbearance were a lesson to every impatient man.

"It's nothing but a scandal!" one man would shout at him. "There's a stable where my office is to stand. I won't have it."

"Why have I to take down that canopy? I've always had it. It's unreasonable," another would break in.

"There's a mistake here, Mr. Bednell. On the plan," etc., etc., cried a third.

"Let's have Something Hot!"

It only required an urchin to ask the show manager for a cigarette picture to complete the heavy load. But Mr. Bednell only smiled, causing some men to bark, but in a surprisingly short time all irate exhibitors were pacified, and the hall gradually assumed an appearance of a show. Workmen hammered, electricians silently ran their cables and climbed their ladders, and men with their hands deep in the pockets of their top coats, collars turned up, stood around with red noses and stamped their feet.

And in the meantime the black London fog rolled in through great doors opened to admit loaded lorries, the ring of the horses' hoofs echoing strangely through the comparatively empty hall.

Then someone comes borrowing tools, and it is necessary to follow him to see where he belongs as a check against his memory. A trade acquaintance comes out of the mist, sneezes, and offers his hand.

"For the love of Mike!" he exclaims, "let us go and have something hot."

Olympia.—

In another day or so crates arrive for your competitor's exhibit. The draymen drop them in the aisle where they will be in your way. Gradually linen-covered machines rise up on finished stands like ghosts and gravestones in the murky atmosphere.

And while one is away sipping Oxo or something stronger, the men will take the opportunity to visit the workmen's bar. They will do this at intervals whether the example is set by their superiors or not, and the reason why lamps refuse to obey the switch is explained.

The Final Touches.

As the opening day approaches the telegraph department increases its staff. Where are the models? Have they left the works? When will they leave the works? Crates block the gangways. The "office" has no doors, and it is necessary to post a sentry over certain mysterious cases containing glass. Some models arrive, are unpacked, staged, and covered with a sheet. But the favourite model is missing. More wires, more words of high abuse, visits to Addison Road Station, and telephone calls. Then the missing machine is found *standing on its head* in an unfrequented gangway, and, while you remove your hat to think, a dray horse breathes with forced draught down the back of your neck.

It is with a feeling of pride that one surveys the stand when all appears finished. You linger to have a last look before going to the hotel. Thank goodness all is ready. Then in a panic you note something is missing. *Where are the catalogues?*

More wires, more telephoning, more visits to Addison Road, and while waiting for news the time is filled in walking round making furtive investigation of other people's progress.

The Pressmen.

And while these things go on, energetic pressmen, with sketch blocks and cameras, make final examination of the machines they had seen before. They wish to make sure that the special features of the new model reviewed in the forecasts have not been altered or abandoned, and they point out their faults.

The show is open at last. The band is playing. The place is warm and brilliant with light. Junior salesmen pose in impressive attitudes by the side of the exhibits. From their expressions one almost assumes that they have designed, built, and finished the machines. "All my work!" they seem to say, and when they are asked a question regarding a certain point—one discovers they know less about it than the enquirer.

One of the most interesting shows was that at which the much-boomed cycle car was exhibited to draw attention away from the trusty motor cycles. Orders were accepted which were not executed, and machines shown which were never duplicated.

How proud were exhibitors with a cycle car on their stand. The hefty ones demonstrated the lightness of the machines (and, incidentally, their own strength) by repeatedly lifting the front and back axles. At the end of two days they could scarcely lift a glass to their lips without a groan.

I remember one particularly tall director who got into his machine to show how comfortable it was. A stout lady followed him, bumped her forehead on the windscreen, and strained the "chassis."

They looked so much like twins in a perambulator that the crowd laughed, and they laughed more uproariously when neither lady nor gentleman could get out again without vigorous assistance from outside.

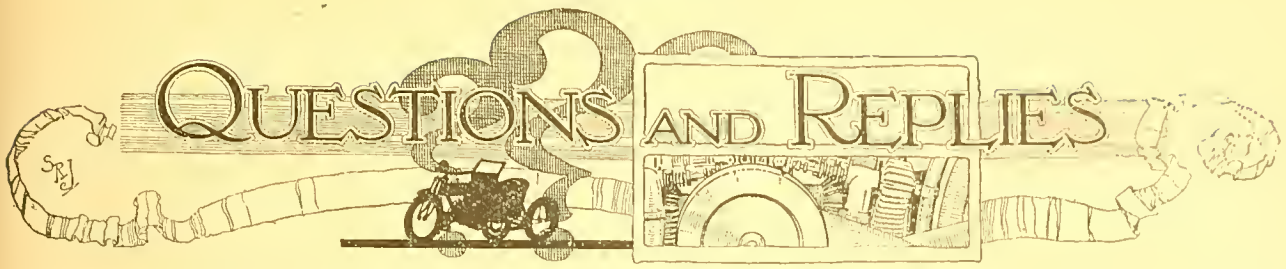
Yes, they were good old times, indeed. Shall we ever see their return? Shall we ever again be surprised when a motor cycling acquaintance turns up as an immaculately-dressed man about town, or reveals his plebeian caste by the pattern of his tie and trousers? Before the show they were all reduced to the common type—the motor cyclist. In mufti, what a difference!

The Whited Sepulchres.

And it is orders, orders, orders from agents from the country, and questions, questions, questions from the crowd, and on the last day, when we are hoping that we shall never attend a show again, the workmen from the factory troop up, some a little "fresh" from their well-equipped saloon. They seem hurt that we have not taken sufficient care of their plating and go off to examine the wares of other firms, to argue about things they little understand, to beg souvenirs, and to have a drink "on the boss."

It is all over, and we leave early to rush back to our families for the week-end. We may have to return again on the Monday to superintend the despatch of the show models—all bought by enterprising agents who have placed their tickets upon them. But they have to go back to the works to be "gone over." How many times has that meant that the show models were merely empty shells, *sans* pistons and connecting rods, *sans* gears in the gear box, *sans* most things that count?

Tanks going into action on the Western Front.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Chain Lubrication.

(1.) I am riding a 5-6 h.p. motor cycle with an exposed back chain. I find that when I keep it oiled, after being out on wet roads, although adjusted slack before going out, next day it is as tight as a drum until oiled and turned round a time or two. Would it be better not to put oil on it at all? I am told that it does better never to oil a chain. (2.) What would you consider the best top gear for an all-chain driven single-cylinder three-speed gear 4 h.p. with sidecar? At present it is 4½ to 1, and, I think, too high.—S.M.

(1.) It would be better not to put oil on the chain, but you might try a little graphite grease or Prices' chain lubricant. (2.) Yes, we think you might try a gear of 5 to 1.

Timing.

(1.) I have taken down my engine for a general overhaul, and after reassembling it I am in doubt as regards the timing of the valves and magneto. There are no marks to go by, but I have set the valves this way. The exhaust is shut the moment the piston reaches the top of the stroke, and just begins to open about half an inch before the bottom of the firing stroke is ended. The inlet valve opens just after the exhaust is shut, and is closed at the bottom of the stroke. Is the timing set right? (2.) The magneto is half-way advanced, and the piston is at the top of the compression stroke with the points about to separate. The engine has developed more power than it has ever had since I have had it in my possession. Now when I advance the spark it occurs three-eighths of an inch before reaching the top, and the engine roars off, but when I retard it a long flame yellow in colour comes out of the exhaust, and it will eventually stop. No flame is to be seen at all when the spark is advanced. I have tried several methods of timing. (3.) My engine is made by White and Poppe, Coventry. The valves are in detachable pockets, so that they can be taken from the cylinder for grinding, etc. Can you tell me if the makers are still in existence, and also the age of the engine?—R.C.H.

(1 and 2.) So far as we can see the timing appears to be quite correct, especially as you say the engine develops more power than it did before. The failure of the engine to fire with the spark retarded may be due to the mixture. (3.) The makers in question are still in existence, but they are now engaged entirely on Government work. The date of your engine is about 1904 or 1905—one of the earlier makes of White and Poppe engines; but the detachable valves and pockets were discarded soon after these engines were first made. The flame coming out of the exhaust is simply an indication of either late firing or a poor mixture. Perhaps if you use rather less air when the spark is in a retarded position the engine will fire more easily. When driving keep the spark as far advanced as possible without allowing the engine to knock.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Date of Manufacture.

I recently purchased a Humber motor cycle with two-speed gear and handle starter. The exhaust pipe comes straight on to the tube from the steering head to the crank case, so part of the frame acts as the silencer. On the right-hand footboard there is a foot pump for lubrication; on the left-hand side are the high and low gear pedals. Will you kindly give me the year this model was put on the market? Also, what is the correct timing for this engine? It is a single-cylinder 3½ h.p. and has a light wicker sidecar attached? How often do I depress the oil pump plunger to lubricate the engine for moderate speed on Cheshire roads, as I am troubled with over-oiling?—H.C.

It is quite evident that your machine is a 1909 model. If you wish for confirmation of this, the engine number should be sent to Humber, Ltd., Stoke, Coventry, and they can then tell you the exact date. You should time the engine in the following way: Valves. Set the exhaust valve to close just after the completion of the exhaust stroke. It will then commence to open when the piston is about one-seventh of the length of the stroke from the bottom of the firing stroke. The inlet should commence to open as the exhaust closes, and remain open for one complete stroke of the piston, or while the flywheels turn through 180°. Ignition. Place the piston exactly on top of the compression stroke and connect up the magneto with the points just about to break and the ignition lever two-thirds retarded. This will mean that with the ignition fully retarded the explosion will take place when the piston has travelled about 1.5 mm. down the firing stroke. Give the engine about half a pumpful every five miles.

Choosing a Machine.

I have decided after the war to invest my modest capital in a motor cycle combination, and, as my means will not allow me to buy a second-hand machine on which to learn, I want to know the best machine that will fill my requirements. I should be pleased if you would give me your opinion.—W.A.P.

As you do not state what your requirements are, we are afraid we cannot tell you what machine will best satisfy them. Moreover, we do not recommend any particular make of motor cycle as the best, but if you care to send us the names of one or two makes that you fancy, and state rather more fully your requirements, we will endeavour to help you in deciding which machine is most likely to satisfy you. If you are not familiar with the names of the leading makes of machines, we should advise you to look through the advertisement and other pages of *The Motor Cycle*.

RECOMMENDED ROUTES.

BRIGHTON TO MANCHESTER.—A.C.B.

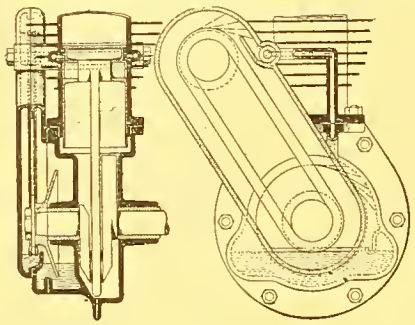
Brighton, Cuckfield, Handcross, Horsham, Rudgwick, Guildford, Bagshot, Windsor, Slough, Beaconsfield, High Wycombe, Tetsworth, Oxford, Chipping Norton, Moreton-in-the-Marsh, Evesham, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Whitchurch, Tarporley, Northwich, Altrincham, Manchester.

BIRMINGHAM TO BLACKPOOL, AND BACK VIA DERBY.—R.S.S.

Birmingham, Sutton Coldfield, Lichfield, Rugeley, Weston, Stone, Pipe Gate, Woore, Nantwich, Tarporley, Warrington, Rainhill, Prescot, Rainford, Ormskirk, Rufford, Preston, Kirkham, Blackpool. Return *via* Preston, Wigan, Ashton-in-Makerfield, Warrington, Knutsford, Holmes Chapel, Congleton, Leek, Ashbourne, Derby, Burton-on-Trent, Lichfield, Sutton Coldfield, Birmingham.

Engine Lubrication.

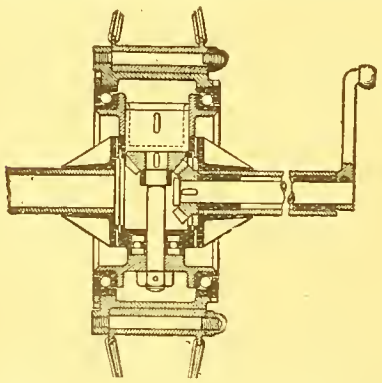
The lower end of a gear casing for enclosing the magneto or other driving mechanism, without direct communication with the crank case, is adapted to serve as an oil sump. The upper end of the casing is provided with lateral opening



and a chamber forming a receptacle for oil. The chamber communicates at its lower end with a passage extending transversely through the cylinder wall from one side of the cylinder to the other. Through this passage is inserted a bolt which secures the cover of the gear case in position. The bolt does not completely fill the passage, but leaves an annular space into which, open at right angles on opposite sides of the cylinder, a pair of passages, which terminate in other passages, provide a return for the oil to the sump. In each of the first-mentioned passages a hole is formed opening into the cylinder at a position over which moves the adjacent end of the gudgeon pin. Oil is delivered from the sump to the receptacle by the splashing caused by mechanism enclosed by the gear case.—F. E. Baker and T. J. Biggs, Precision Works, Birmingham, No. 118,770, September 12th, 1918.

A Steerable Wheel for Three-wheeler.

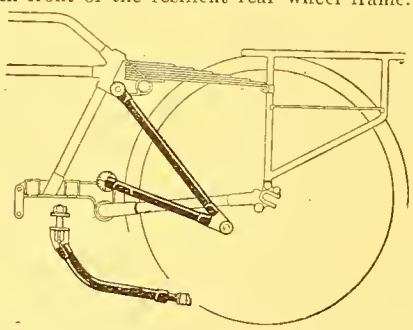
By this invention steering is effected from a central point in the hub of the wheel, and the mechanism is completely



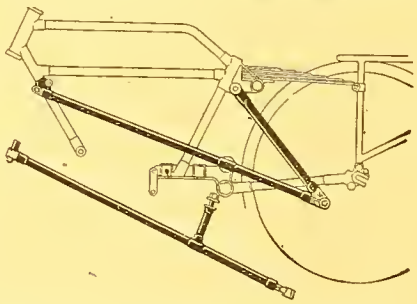
enclosed. The axle tube is in two parts, which are connected by a socket member having a cylindrical bore coincident with the steering axis. Secured within the socket is a barrel member, upon which is mounted a drum provided at each side with circular flanges. The drum is free to oscillate upon the barrel, and is secured in position preferably by a long bolt, which passes completely through the barrel. Between the lower faces of the barrel and the drum is arranged a suitable ball thrust bearing to take the load. The movement of the drum upon the barrel is effected through a pair of bevel pinions, one of which is keyed upon the bolt connecting the drum to the barrel member, the other being keyed upon a shaft passing through the axle tube. This shaft passes out of the axle tube, and is provided with an arm connected to the steering mechanism.—W. Ellis, Coventry, No. 118,158, August 20th, 1918.

Sidecar Connections for Spring Frames.

This invention relates to improvements in sidecar frames for connection with the rigid frame portion of a spring frame cycle. It is proposed to connect such sidecar frame rigidly to the cycle frame in front of the resilient rear wheel frame.

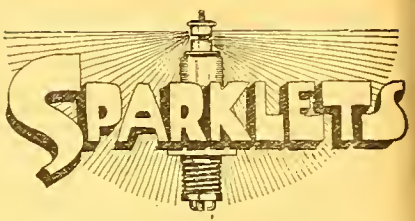


An auxiliary frame is provided comprising two members connected rigidly at their forward ends respectively to the upper and to the lower parts of the main frame in front of the rear wheel and joined at their rear ends by a heavy lug to which the rear end of the sidecar frame can be



holted. The illustrations show two—of three—alternative methods of applying the patent, the second one having an extension of the lower member to the front down tube.—John Marston, Ltd., and John Ernest Greenwood, Wolverhampton, No. 118,968 September 19th, 1918

We are advised by Hobart Bird and Co., Ltd., the well-known pioneer firm of cycle manufacturers of St. Patrick's Road, Coventry, that in order to denote the particular class of trade they are engaged in, it has been decided to change the name to Hobart Cycle Co., Ltd.



An All-steel Inflator.

An inflator for motor cycle use has been placed on the market by J. T. Bradford, of Colne, Lancashire. It is solidly constructed of steel with brazed ends, and retails at 10s.

No Address.

The Clyno Engineering Co. write stating that they have received several letters recently from correspondents asking for the new Clyno folder, but giving no address.

Bowden Good Year.

Messrs. the Bowden Brake Co., Ltd., publish their annual balance sheet to August 31st. The net balance available for distribution is £15,265 15s. 11d. A dividend of 12½% on preference and ordinary shares will absorb £3 451 16s. 3d. The reserve fund is increased by £2,500. Freehold buildings write off amounts to £1,500, and the workers' bonuses £500, leaving a balance to carry forward of £7,313 19s. 8d.

Carrying On.

Those saddled with machinery out of action on account of some broken irreplaceable part would do well to write to Messrs. Barimar, Ltd., 10, Poland Street, W.1, for a copy of an illustrated booklet showing how such parts may be returned to commission. It is claimed that as a result of Barimar activities hundreds of thousands of tons of idle machinery have been put into working order.

Dunlop Rubber Co., Ltd.

A circular issued by the secretary of the Dunlop Rubber Co., Ltd., states that the issue of the report and balance-sheet for the year ended August 31st must be considerably delayed, owing to various causes. The directors, being of opinion that a further distribution to the ordinary shareholders should be made now, have declared an interim dividend for the half-year ended last August of 1s. 6d. per share on the ordinary shares.

B.S.A.'s in East Africa.

We have received a very interesting little book from the B.S.A. Co. entitled, "With the Flag through German East Africa." It deals with the performance of the B.S.A. motor cycle in what is described as the world's greatest reliability trial, and consists principally of letters from officers and riders of the B.S.A., which was the principal machine used in this campaign. Extracts from experiences published in *The Motor Cycle*, with accompanying illustrations, are also given, and the whole forms a very attractive brochure of interest, not only to B.S.A. riders, but to motor cyclists as a whole. A copy can be obtained free on request to the B.S.A. Co., Ltd., Birmingham.

PEACE & PETROL ON EARTH AGAIN.

COLMORE DEPOT,

BIRMINGHAM, MANCHESTER, LIVERPOOL.

The Leading House in the Country for Motor Cycles.

SEND YOUR ORDER AT ONCE
TO SECURE EARLY DELIVERY.

Photo. Henri Manuel

M588.

Marshal Foch says

in his published writings on the war that *sureté* or security is one of the precedents for a successful offensive, and a successful offensive means Victory.

This dictum may be applied very aptly to the case of tyres. With them security must be assured by the purchaser, and security in their case means mileage and freedom from trouble. These are the two outstanding features that should be looked for in tyres, and where they are found the resultant will always be service.

Wood-Milne Motor Tyres

present the fullest security to the car owner. They are the ideal tyre equipment, the one aim behind their manufacture being service. Their magnificent enduring qualities have won for them unstinted praise and widespread popularity.

WOOD-MILNE, Ltd., 21, Albion St., Gaythorn, Manchester.
Telegrams: "Wadmilo, Manchester." Telephone: 8774 City (3 lines).

LONDON - - - - - - 42-46, WIGMORE STREET, W.1.
'Phone: Mayfair 735, 6789, 6790. Tele.: 'Wudmilo, Wesdo. London."

Preston, Newcastle, Leeds, Birmingham, Bristol, Glasgow, Dublin, Belfast, Vancouver, Calcutta, Bombay, Johannesburg, etc.

OUR PEACE TERMS

The time that we have all been longing for has arrived, perhaps a little sooner than most people expected, and, in the "Peace" issue of this paper, we think that we can do no better than to discuss our post-war policy. During the war we have been faced with great difficulties—shortage of labour, difficulty in obtaining parts, pressure of Government work, railway delays, etc., which we trust will now be entirely removed.

During the time that we have been in the trade, we have realised that dealing in Second-hand Motor Cycles is like dealing in horses—that sometimes faults exist that are not apparent even to ourselves, and also that a small percentage of people expect a new machine at a second-hand price.

Our aim is to satisfy **everyone**, and as we realise that some people are hard to satisfy, whilst every customer wishes to get a machine exactly to his liking, from to-day we are adopting the following principle, from which we trust we shall never depart.

IF YOU PURCHASE A MACHINE FROM US WHETHER FOR CASH OR EXCHANGE, WE GIVE YOU THREE DAYS' CLEAR TRIAL, AND IF IN THAT TIME YOU DO NOT APPROVE OF THE MACHINE WE GIVE YOU YOUR MONEY BACK IN FULL, WITHOUT QUESTION, That is to say, our Peace Terms are:

SATISFACTION OR YOUR MONEY BACK.

In addition to this, all our old terms hold good, namely, that we will exchange your machine within THREE WEEKS of purchase for anything else from stock, and that all our machines, unless otherwise stated, are GUARANTEED FOR THREE MONTHS.

We would remind Country customers that they can still send machines by rail, and should write to us if in difficulty; and we remind all our customers that none of the machines advertised below require permits.

In concluding our Peace Message, we thank all those who have supported us, and helped us to keep going during the trying times that are past, and we ask for their continued support in the future. The great majority, we know, we have pleased, and we know that they will come back to us. To the inevitable few who have not been satisfied we apologise, and ask for their indulgence, owing to the difficult times now past for ever.

SELECTION FROM STOCK.

A.J.S., 2¾ h.p., 2-speed, clutch, kick-start, run 1,000 miles only — 55 gns.
ABINGDON KING DICK, 1915, 4 h.p., T.T., 3-speed, sporting Sidecar, special competition machine, extra large tank — 55 gns.
B.S.A., 1913, 3½ h.p., 2-speed clutch — 27 gns.
BRITISH EXCELSIOR (new), 2¾ h.p., J.A.P., 2-speed, clutch, 1918 model — £48 10
BRADBURY, 1914, 4 h.p., 2-speed, countershaft — 32 gns.
BRADBURY, 1914 4 h.p., 2-speed, clutch, re-enamelled and re-plated — 32 gns.
BAT-J.A.P., 1910, 3½ h.p., Mabon clutch — 16 gns.
CALTHORPE-J.A.P. (new) 1918 4-5 h.p. twin Combination — £81 6
CALTHORPE-J.A.P. (new), 1918, 2¾ h.p. 2-speed, clutch — £47 0
CALTHORPE-J.A.P. 1916, 2¾ h.p., 2-speed, clutch — 32 gns.
CALTHORPE-J.A.P., 1915, 2¾ h.p., 2-speed, clutch — 27 gns.
CALTHORPE JUNIOR, 2-speed, 2 h.p. — 21 gns.
CHASE-J.A.P, 1915, T.T. 6-8 h.p., round tank, Jardine 2-speed — 45 gns.
DOUGLAS, 1911, single-speed — 16 gns.
DOUGLAS, 1911, 2-speed — 21 gns.
DOUGLAS, 1913, 2¾ h.p., 2-speed, T.T. — 31 gns.
DOUGLAS, 1914, 2¾ h.p., 2-speed, T.T. — 35 gns.
DOUGLAS, 1914, 2¾ h.p., 2-speed, as new — 39 gns.
ENFIELD 1916, 3 h.p., 2-speed, clutch, kick-start, as new throughout — 42 gns.
ENFIELD, 1916, 3 h.p., 2-speed, clutch, kick-start — 38 gns.
F.N., 1913 5-6 h.p., 4-cylinder, 2-speed, clutch — 29 gns.
HUMBER, 1911, 3½ h.p., 2-speed, clutch handle-start — 19 gns.
HUMBER, 1912, 3½ h.p., 2-speed, clutch, handle-start — 23 gns.
HUMBER, 1913, 3½ h.p., 2-speed, clutch, handle-start — 27 gns.
HUMBER, 1918, 3½ h.p., flat twin, 3-speed, military model, run under 1,000 miles — 69 gns.
HUMBER 1918 6 h.p. flat twin water-cooled Combination, in fine condition — 89 gns.
HUMBER 1918 6 h.p. flat twin water-cooled Combination, with spare wheel, as new — 96 gns.
INDIAN, 1916 Powerplus, 3-speed, 8-10 h.p., as new — 72 gns.
INDIAN, 1915, 7-9 h.p., T.T., clutch, good order — 42 gns.
INDIAN, 1914, 7-9 h.p., 2-speed, clutch — 39 gns.
INDIAN, 1912, 3½ h.p., single-speed — 21 gns.
JAMES (new) 1918 5-6 h.p. 3-speed military model Combination, 28×3in. wheels — £104 0
JAMES (new) 1918 4½ h.p. 3-speed Combination — £99 0
JAMES, 1914 4½ h.p. 3-speed, re-enamelled — 36 gns.
JAMES, 1914, 4½ h.p., single-speed, re-enamelled — 31 gns.
KERRY-ABINGDON, 1914, 4 h.p., T.T., clutch — 26 gns.
LINCOLN-ELK, 1913, 3½ h.p., variable gear — 21 gns.
MOTOSACOCHE, 1917. 3½ h.p., twin, Enfield gears, kick-start, and coach Sidecar — 59 gns.
MORGAN, 1914, sporting, air-cooled, 8-10 h.p. — 75 gns.
MORGAN, 1914, Grand Prix, water-cooled J.A.P. — 98 gns.
NEW IMPERIAL, 1916. 2-speed J.A.P., 2¾ h.p. — 31 gns.
NEW IMPERIAL, 1915, 2-speed J.A.P., 2¾ h.p — 26 gns.
N.S.U., 1913, 3 h.p., 2-speed, clutch — 22 gns.
N.S.U., 1914, 3 h.p., T.T., actual T.T. mount — 28 gns.
PRECISION, 1914, 4 h.p., 2-speed, clutch — 26 gns.
PREMIER, 1914, 3½ h.p., 3-speed coach Sidecar — 37 gns.
PREMIER, 1914, 3½ h.p., 2-speed countershaft — 31 gns.
PREMIER 1913 3½ h.p. 3-speed Combination — 31 gns.
PREMIER, 1914. 3½ h.p., 3-speed — 29 gns.
PREMIER, 1913, 2½ h.p., clutch — 21 gns.
QUADRANT, 1914, 4 h.p. 2-speed, clutch, re-enamelled — 31 gns.
QUADRANT, 1913, 4 h.p., 3-speed — 29 gns.
ROVER, 1914 (late), 3½ h.p., 3-speed, clutch, as new — 37 gns.
RUDGE-MULTI, 1917, T.T., 3½ h.p., I.O.M., disc wheels — 65 gns.
RUDGE-MULTI, 1916, T.T., 3½ h.p. I.O.M. — 59 gns.
RUDGE-MULTI, 1916, T.T., 3½ h.p., good order — 46 gns.
RUDGE-MULTI, 1915, T.T., 3½ h.p., good order — 39 gns.
RUDGE-MULTI (new), standard 3½ h.p. — 62 gns.
RUDGE-MULTI, 1914, 3½ h.p., re-enamelled — 36 gns.
RUDGE-MULTI, 1913, 3½ h.p., standard — 28 gns.
RUDGE, 1913, 3½ h.p., variable gear, re-enamelled — 29 gns.
SINGER, 1913 2¾ h.p., lightweight, re-enamelled — 19 gns.
SUNBEAM, 1915, 6-8 h.p., 3-speed, Gloria Sidecar — 87 gns.
TRIUMPH 1913 3½ h.p. 3-speed Combination — 35 gns.
TRIUMPH, 1913, 3½ h.p., T.T., clutch — 25 gns.
ZENITH-GRADUA, 1915, 3½ h.p., staodard, re-enamelled — 37 gns.
ZENITH-GRADUA, 1914, 3½ h.p., standard, re-enamelled — 32 gns.
ZENITH-GRADUA, 1913, 3½ h.p., standard — 27 gns.
ZENITH-GRADUA, 1912, 3½ h.p., standard — 24 gns.
OMEGA, 1916, 2-speed, 2-stroke — 27 gns.
CARDEN MONOCAR, 1915, de luxe, 5-6 h.p. J.A.P., overhauled and repainted — 55 gns.
(Any machine sent on "The Motor Cycle" deposit system.)

'Phones: Hampstead 5392, 4904

RIDER TROWARD & CO.,

Open till 7 p.m. and Sundays.

31, 40b, & 78, High Street,

One minute Hampstead Tube Station.

HAMPSTEAD, N.W.3.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ——— & Co. ILIFFE & SONS Ltd., and crossed ———

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9189

CROW Bros., Guildford.—A.J.S. Agents since 1912. Write us for your requirements. [9777

STEVENS, 4¼h.p., Bosch mag., splendid order; £30, or offer.—Davey, 48, Market Place, Witney, Oxon. [9672

1916 4h.p. A.J.S., in fine condition, back tyre brand new, lamp and horn; £65.—Crow Bros., Guildford. [9684

A.J.S., 2-speed, £35; 4h.p. twin, £65; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [8750

A.J.S., 2¾h.p., 1914-15, 2 speeds, enclosed, all-chain drive, lamps, horn, tools, etc.; £32/10, bargain.—Collinge, Plumber, Duke Bar, Burnley. [9767

A.J.S. 1914 Combination, in thorough order, 3-speed, kick, and clutch, enclosed chassis, new Dunlop tyres; appointment.—11, Gordon Rd., Church End, Finchley, N.3. [9853

A.J.S. 1916 (Sept.) 6h.p. Combination, extra heavy tyres, largest size head light, tail light, spare chains and valves, mileage 7,000; £85.—Box L7,522, c/o *The Motor Cycle*. [9150

6h.p. 1915 A.J.S. Combination, interchangeable wheels all round, spare wheel and tyre, Lucas and F.R.S. lamps, mechanical horn, wind screen, Coverall apron, very smart; 90 gns.—Farrar, 19, Hopwood Lane, Halifax. [9840

PAX VOBISCUM!

The armies and navies of England and of her Allies having secured this condition, why not likewise assure yourself of such a "peace" of mind in deciding to entrust us with your future motor dealings?

MAUDES' MOTOR MART,
100, Great Portland Street, LONDON, W.1.

MOTOR CYCLES FOR SALE.

A.J.S.

1914 6h.p. A.J.S., 3-speed, kick start, h.b.c. clutch, enclosed chain drive, lamps, horn, etc., just been renovated throughout, cash price £50; also Canoelet spring wheel coachbuilt sidecar for same, £5/10; seen after 6, or appointment; must sell.—Air Mechanic Dansie, 9, Silverthorne Rd., Clapham. [9756

1916 A.J.S. Combination, 6h.p., 3-speed, kick starter, not been used for over 16 months, A.J.S. spring seat-pillar, Stewart speedometer, Lucas bulb horn, large size F.R.S. head lamp with Lucas generator, new Lucas sidecar lamp, Millers rear lamp and Lucas generator, spare wheel carrier, 4 sound inner tubes, A.J.S. luggage carrier, sidecar stand, storm apron, new spare back chain, spare plugs, chain links, valve complete, full tool roll, etc., has done very little work, and is in splendid condition; £100.—J. W. Kinsey, Middlewich. [X9815

Alldays.

ALLDAYS Allen 2-stroke, in stock. Tarde supplied. —Alexander's, 272, Gt. Western Rd., Glasgow. [9265

1915 Alldays Allen, 2 speeds, h.b. clutch, fine tyres, magnificent goer; £28.—19, Hopwood Lane, Halifax. [9842

NEW Alldays 2-stroke, 2-speed model; £46, complete; cash or deferred.—Harrods, Ltd., Brompton Rd., S.W.1. [9735

NEW Alldays, 2-stroke, 2-speed model; £46, complete; cash or deferred.—Harrods, Ltd., Brompton Rd., S.W.1. [9601

ALLON, 1917, 2¾h.p., 2 speeds, handle-bar clutch, new condition throughout; £35.—Thom, 32, 2nd Av., Selly Park, Birmingham. [9709

ALLDAYS Matchless 3½h.p. Combination, 2 speeds, Bosch, Senspray, drip feed, good running order; £17/10.—Hayes, 344, Euston Rd., W.C.1. [9737

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8760

Ariel.

3½h.p. 1917 3-speed Ariel and coachbuilt sidecar; cost £96, with accessories, scarcely used; accept £75. —Bates, Quarry Cottage, Guildford. [9469

Arno.

3½h.p. Arno Combination, o.h., B. and B., Druids, adjustable pulley, aluminium footboards; £14, or offer.—152, Camberwell Grove, Camberwell. [9679

Bat.

BAT-J.A.P., 1914, 5-6h.p., 3-speed, tyres as new, electric or acetylene lamps, mileage 8,000, in very good order; 60 gns., or near offer.—Lieut. Kirkby, Mapleton, Worcester. [9151

Bradbury

4¼h.p. Bradbury Coachbuilt Combination, 2 speeds, new condition; £35; would separate.—Bradley, 14, Bowles Rd., O.K.R., S.E.1. [9675

BRADBURY 4h.p. and Sidecar, 1913 model, 2-speed, splendid order throughout; great bargain, £28/10.—Speechley, 1, Gunnersbury Lane, Acton Hill, London. [9772

6h.p. Bradbury, 3-speed countershaft, Binks 3-jet, Bosch waterproof, quick detachable back wheel, hood, screen, mechanically sound, several fitments; particulars given on application; £60, or offer; ready for the road.—Eccles, 9, Balfour, Leyland, Lancs. [9711

Brough.

BROUGH, 3½h.p., o.h.v., T.T. model, 2-speed countershaft, chain-cum-belt drive, head and tail lamps, separate generators, horn, spares, purchased new last year, not ridden 500 miles, still like new; £60, or nearest offer.—Box 2,441, c/o *The Motor Cycle*. [X9928

B.S.A.

B.S.A., new 4¼h.p. 3-speed model, actually in stock. —Moss, Wem. [X9897

B.S.A., 1913, 2-speed and clutch, reliable, economical; £27/10; any trial.—Deane, Matlock Bath, Derbyshire. [X9913

1912-13 B.S.A., 3½h.p., 2-speed, free engine, little used, excellent condition; £28.—School, Bilsington, Kent. [9769

B.S.A.—Several combinations in stock, 1914, 1916, and 1917.—Service Co., 292, High Holborn, London, W.C.1. [9655

1916 B.S.A., all-chain model, and good coach sidecar; £60; very nice machine.—136, Lavenham Rd., Southfields, S.W.18. [9854

B.S.A., K., 1917, £60, or exchange Enfield combination with dynamo lighting set.—Call 94, Hoppers Rd., Winchmore Hill, N.21. [9790

B.S.A., late 1914 model, Villiers free engine hub, first-class condition, new Dunlop tyres, complete with lamps; £35.—68, High St., Crawley, Sussex. [9731

3½h.p. B.S.A., 1915, chain-cum-belt, £43, excellent condition, not done 500 miles, original tyres as new, complete with tools, lamp, and horn.—27, Richmond Av., Willesden Green. [9683

MOTOR CYCLES FOR SALE.

Calthorpe.

1916 Calthorpe, 2-stroke, lamps and horn, splendid condition; £30.—Parker and Son, St. Ives, Hunts. [9697

CALTHORPE-J.A.P. Lightweight, 1916 model, 2-speed, in splendid condition; £28.—25, Greengate St., Stafford. [X9873

CALTHORPE-J.A.P., 2¾h.p., 1915, 2-speed, in splendid running order, very fast; £25, lowest.—Box L7,775, c/o *The Motor Cycle*. [9828

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham [0955

CALTHORPE-J.A.P. Motor Cycles. Immediate delivery from stock. Trade supplied, no permits.—Alexander and Co., 115, Lothian Rd., Edinburgh, and 272, Gt. Western Rd., Glasgow. [9260

CALTHORPE-J.A.P., 2½h.p., Enfield 2-speed and free engine, late 1916 machine, in excellent condition; a great bargain, £26.—Longman Bros., 46, Hillcrest Rd., Acton. 'Phone: 1578 Chiswick. [9824

CALTHORPE-J.A.P., 1916, 4-5h.p., twin combination, 2-speed, clutch, handle starting, sporty and very fast, only used on leave, condition absolutely as new; £65, or would exchange for cycle car.—476a, Harrow Rd., Paddington, London, W.9. [9771

Campion

FOR Sale, powerful motor cycle and sidecar combination, specially built Campion for Cotswolds, 6h.p. J.A.P. engine, framé and sidecar chassis with extra strong girdered chassis, 3-speed Jardine gear box with countershaft 2-chain drive; trial run by appointment.—E. J. R. Cross, Pomfret House, Cheltenham, Glos. [9660

Chater-Lea.

1915 7-9h.p. Chater-Lea Combination (H. and S.); £56.—Ross, 86, High Rd., Lee. [9721

Clyno.

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London. [8752

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; ditto, new single speed, £34; ditto, 2-speed countershaft, £41; E.P. or exchange.—Service Co., 292, High Holborn, London. [8741

Coventry Eagle.

COVENTRY Eagle, new 2-speed countershaft, hand controlled, £44.—Service Co., 292, High Holborn, London. [8753

Dayton.

DAYTON 2-stroke, nearly new machine; any trial run before purchase; £16/10.—Speechley, 1, Gunnersbury Lane, Acton Hill. [9775

Dalm

DALM, 1916, 2-stroke, little used; £20, nearest offer.—24, Beauval Rd., East Dulwich. [9820

Diamond.

DIAMOND-J.A.P. 2-speed, Enfield gear. Immediate delivery from stock, no permits, trade supplied.—Alexander's, 115, Lothian Rd., Edinburgh. [9262

Douglas.

1915 Douglas, 2¾h.p., 2-speed; £45.—Below.

1916 Douglas, 2¾h.p., 2-speed; £48.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0480

DOUGLAS, 1913, 2-speed, good condition, very fast, accessories; £32.—47, Hamilton Rd. Reading. [9793

DOUGLAS.—Write us your requirements; either new machines or second-hand.—Moffat, Yeovil. Tel.: 50. [5855

DOUGLAS Motors.—Send your name for waiting list now to Gibb, Douglas Expert, Gloucester. 'Phone: 852. [4749

1914 Douglas, 2¾h.p., in perfect order, 2-speed, free engine, lamps, horn, etc.; £33.—Crane, Sutton, Ely, Cambs. [9781

DOUGLAS, 1914, 2¾h.p., lamps, speedometer, tyres nearly new, perfect condition; £33.—Taylor, 27, Amhurst Rd., Ealing, W.13. [X9813

MANCHESTER.—Douglas, 2¾h.p., late 1914, 2-speed model, smart, fine running order, fast, footboards; offers.—19, Mountfield, Prestwich. [X9914

DOUGLAS, 1914, 2¾h.p., 2 speeds, Colonial model, lamps, horn, tools, lovely condition; £38.—C. Palmer, 61, Commercial Rd., Lambeth, S.E.1. [9740

DOUGLAS, 2-speed, clutch, 1911; £13; exchange for higher power, cash adjustment.—R. A. Matthews, Culverdene, Tower Rd., Worthing, Sussex. [9712

DOUGLAS, 1914, 2¾h.p., lamps, horn, footboards, perfect order, tyres good, not used 19 months; bargain, £32/10.—161, Upper Tooting Rd., S.W. [9815

DOUGLAS, 2¾h.p., 2-speed gear, free engine clutch, complete with lamps, horn, etc., run little during war; any trial; £32/10.—Parker's, Bradshawgate, Bolton. [X9905

DOUGLAS, 1914, 2-speed, complete with lamps, horn, and knee-grips, 36 gns.; 1916 ditto, 50 gns.; lady's ditto, £29; E.P. or exchange.—Service Co., 292, High Holborn, W.C.1. [8739

LATE 1913 Douglas, 2-speed countershaft, Miller's lamps, horn, new Dunlops (heavy), condition perfect, not used 3 years; £26.—Wood's Garage, Ryecroft, Ashton-under-Lyne. [X9896

Hear it Ring!

The night has passed; the DAWN has come.

Heartfelt Congratulations to all the Motor Cyclists who have played their part in achieving

THE

GLORIOUS VICTORY

IN WHICH WE ALL REJOICE TO-DAY.

D. C. LAMB,

151, High Street,

WALTHAMSTOW,

'Phone: 169, Walthamstow;

and 50, High Road, WOOD GREEN.

'Phone: 1956, Hornsey.

MOTOR CYCLES FOR SALE.

Enfield.

1917 6h.p. Enfield Combination all on, original tyres; 75 gns.; appointment.—Johnson, Bolsterstone, Sheffield. [9806

1915 3h.p. Enfield, 2-speed, not used for 12 months, splendid condition; £40.—Parker and Son, St. Ives, Hunts. [9698

6h.p. Enfield Combination, complete, lamps, horn, spares (not scratched); any trial; £70.—50, St. John's, Worcester. [X9857

1917 Enfield and Sidecar, 3½h.p., lamps, horn, had very little wear; £65.—Below.

1916 Enfield Combination, 6h.p., lamps, horn, speedometer, as new; £85.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0481

1916 6h.p. Enfield Combination, excellent condition; £68.—Ross, 86, High Rd., Lee. [9722

1916 8h.p. Enfield Combination, splendid condition, fast; owner lost leg and unable to ride; £85, or offer.—Pritchard, Foxhill, Sutton Coldfield. [X9854

ENFIELD Combination, 6h.p., 1916, hood, screen, etc.; naval officer going abroad; genuine bargain, 68 gns., no offers; close inspection invited.—Box L7,740, c/o *The Motor Cycle*. [9690

ENFIELD 1915 3h.p., 2-speed, kick start, lamps, tyres and tubes, and condition like new, stored two years, 140 m.p.g., fast; full particulars; £45.—Westons, Vincent Rd., Clacton-on-Sea. [X9875

ENFIELD 6h.p. Combination, 1917 model, complete with lamps, horn, etc., tip-top condition throughout, £85; also ditto, 1915 model, new tyres all round, lamps, horn, etc., 70 gns.—Parker's, Bradshawgate, Bolton. [X9906

ENFIELD Motor Cycle 6h.p. (late 1915) Combination for sale, perfect condition, Lucas dynamo lighting set, speedometer, horn, hood, etc., many new spare parts; price £90.—Apply, H. Blaiberg, Lostwithiel, Cornwall. [9580

Excelsior.

BRITISH Excelsior Motor Cycles, 2-stroke and Jap models in stock; no permits, trade supplied.—Alexander and Co., 115, Lothian Rd., Edinburgh. [9264

BRITISH Excelsior, 3½h.p., 3-speed, Sturmey-Archer countershaft gear, brand new; £72; no permit required.—Alexander's, 115, Lothian Rd., Edinburgh. [9266

Fafnir.

3½h.p. Fafnir, B. and B., mag., accessories, running order; bargain, £10, or nearest.—Pooley, 1, Wastdale Rd., Forest Hill. [9826

Harley-Davidson.

HARLEY-DAVIDSON 1915 Combinations in stock.—Service Co., 292, High Holborn, London, W.C.1. [9656

HARLEY-DAVIDSON 1915 Combination, electric lighting, new sidecar; £58.—51, Maplethorpe Rd., Thornton Heath. [9717

1917 Harley Combination, mileage under 2,000, with brakes for one-legged rider; £100.—Graham, Spring Rd., Wrexham. [9783

HARLEY-DAVIDSON Latest Standard Model, with special Harley Montgomery sidecar; £135.—Parker's, Bradshawgate, Bolton. [X9903

LATE 1915 Harley-Davidson, 7-9h.p. Combination, only used during leave; bargain, £68.—Lieut. Williams, Emlyn House, Brynmawr, Breconshire. [X9814

HARLEY Combination, 1915, in perfect mechanical condition, and well cared for, electric lighting, self-charging, the property of an officer, little used.—Reply, Box L7,760, c/o *The Motor Cycle*. [9752

Henderson.

1915 7-9h.p. Henderson Combination; £65.—Ross, 86, High Rd., Lee. [9723

Humber.

HUMBER, new 3½h.p. flat twin, 3-speed model, in stock.—Moss, Wem. [X9898

HUMBER Lightweight, 2h.p., Bosch, B.B. carburetter; £12.—Comerford, Southgate, Clarence Rd., Teddington. [9700

1912-13 Humber, 3½h.p., 2-speed, handle starting, very good condition, tyres nearly new; 20 gns.—201, High Rd., Streatham. [9857

HUMBER, 2-speed, clutch, lamp set, coach sidecar, engine rebushed; £28, offer.—71, South Side, Clapham Common, S.W. 'Phone: 322 Brixton. [9801

3½h.p. Humber Combination, 2-speed, free engine, handle starter, all accessories, splendid condition; £25.—Palmer, 231, Commercial Rd., Peckham, London, S.E. [9663

HUMBER, latest 6h.p. flat twin, water-cooled, Cooper sidecar, screen, hood, lamps, speedometer, guaranteed mileage under 1,000, perfect order; cost £125, sell £95, no offers; seen Birmingham.—Box 2,441, c/o *The Motor Cycle*. [X9929

HUMBER 1918 3½h.p. Flat Twin, 3-speed countershaft, all-chain drive, only run 600 miles; £75, or with Mills-Fulford sidecar; £90, complete.—Smith Bros., C.C.R. Motor Works, St. Ann's Well Rd., Nottingham. [X9876

Indian.

1915 7-9h.p. Powerplus 3-speed Indian; £60.—Ross, 86, High Rd., Lee. [9725

NOVEMBER 28TH, 1918.

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Urgent Matters.

NOW that the end has come at last there is need for all to put on their thinking caps and prepare for further struggles, not so sanguinary as the last, and fortunately not so serious, but struggles nevertheless that demand the best efforts of those waging them. The Defence of the Realm Act and its many orders have served their purpose. The time has come when the majority of the regulations and restrictions may be cancelled. Even the daily papers are discussing how these may best and most quickly be removed from their position as a menace to normal everyday existence; but they have overlooked one important consideration, which is that the Act was introduced to this nation for "the duration of the war," and that a House of Commons Committee has decided that "the duration" shall mean the period from the beginning of the war until *six months after the signing of peace.*

Thus, getting rid of the regulations is not likely to be such an easy matter as would appear at first sight. And, moreover, do we want to be rid of them altogether? This may appear a strange question to be put to motor cyclists who have suffered so much inconvenience from the Act, and there can be no question that as regards 90% of it the sooner it has gone the better we shall be pleased. It, however, has done one or two things for which we may be thankful, and in which we may hope the lead may be followed. For instance, there is the regulation compelling all vehicles to carry an independent rear light.

No motorist of any experience or intelligence would like to see that regulation removed. Who cannot remember the narrow "shaves" he has had in days gone by from horse vehicles, handcarts, and push cycles carrying no rear lamp? Do we want a return of this very real danger? The extra trouble imposed on the motor cyclist as the result of having to keep his own rear light going is more than compensated by the advantage of safer driving. And with the general coming of electric lighting this apparent drawback will practically cease to exist.

And now as to fuel. Many dailies have veered round in their wholesale condemnation of all motorists, and are now beginning to suggest timorously that petrol is necessary, must be made available, and, moreover, very soon will become available. Last week we announced some modifications of the petrol restrictions. Next month practically all who have petrol may use it within a radius of thirty miles.

Our opinion is that this aspect of the case is rather a side issue. Whether petrol be rare or plentiful there is one thing that it certainly will not be for a long time to come, and that is *cheap.* After all, there are two sides to the question, and if anyone had an article of which he could sell unlimited quantities for five shillings, it is not to be expected that he would put it on the market for one, or even two shillings. Whether he would or not the petrol companies certainly would not, until they were forced to do so.

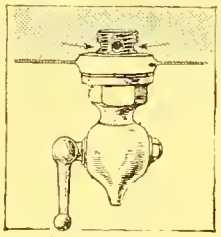
It is this forcing process that must be borne in mind. We have already dealt with it, almost *ad nauseam*, one might say, but it was necessary, and it still is necessary. Home-produced fuels must not be forgotten, even if petrol is offered to us in quantity. It is incumbent upon the motoring community to bear in mind the warnings already given in this journal of the means that may be employed by the petrol monopolists to capture and secure the markets for themselves. Our warnings still hold good—in fact, they have more point now than they ever had before, because there is now less time in which to plan a course of action, and in which to carry it out. Will the associations, the manufacturers, and the motorists think of what we have urged them to think, and then will they combine to guarantee the benzole producers a sure market and a fair profit? The time at their disposal is short, and it may soon be too late.

An index to the advertisements in this issue will be found on the page facing the back cover

IDEAS: Useful and Ingenious.

EMPTYING PETROL TANK.

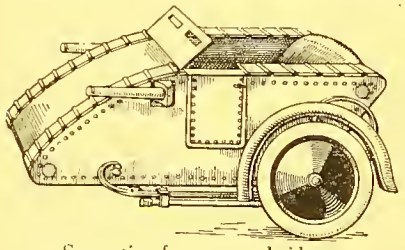
OCCASIONALLY one comes across a petrol tank that will not empty itself of about the last quarter of an inch of its fuel. This is generally because the petrol union outlet projects too far into the tank. It can be cured very simply by removing the screwed in connection and drilling a hole right through the sides just above the external flange, so that when screwed back through the tank bottom the holes will be just level with the floor of the tank.—L.A.B.



Facilitating the emptying of a petrol tank.

A "TANK" SIDECAR.

I HAVE noticed several different designs of sidecar bodies, and car bodies of motor boat, aeroplane, and other designs, but I have never yet seen one of the tank design. I enclose a simple sketch of a tank design body, which I think would look all right, or it could be used also on war service, provided it were built on armoured lines, and could be entirely closed in and fitted with two machine guns. It would give much more protection than the sidecar which the



Suggestion for armoured sidecar.

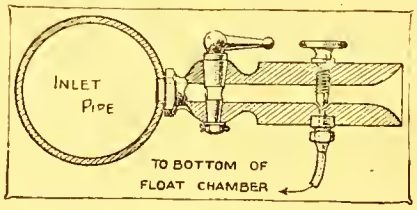
Machine Gun Corps are at present using. I am at present with the M.T., A.S.C., somewhere in sunny France, and I may say your paper has passed away many a weary hour for me. I trust it will not be long before I am back again, raising the dust on the good old Blighty roads. I wish your paper every success.—(Dvr.) J. Govan.

SLOW RUNNING IN FREE.

IN a recent issue "Road Rider" made an appeal for the much sought after "tick over in free." Like him, I have noticed that motor cyclists are only too willing to err on the safe side and to keep their engines running rather over fast. I think that, considering the ingenuity of motor cyclists in general, it is surprising to see this fault so prevalent.

At the moment I can recall no fewer than three small extra fittings, supplied by accessory dealers, which have all been proved satisfactory, and which any amateur can fit to his own machine.

I am especially thinking of the Wilkinson pilot jet. It is priced low enough to bring it within reach of anyone, and is well worth the money asked. It provides very easy starting, with the main throttle shut. It can be adjusted by the milled screw to give a perfect "tick-over." Incidentally, in my opinion, a machine fitted with a Wilkinson pilot jet and

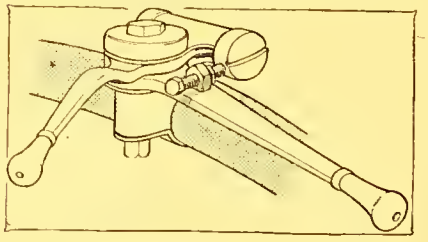


The Wilkinson by-pass.

a decompressor should not need that unmechanical makeshift, the exhaust valve-lifter.

Failing any of the three adaptations mentioned above, in many cases a very careful adjustment of the Bowden wire will suffice. A 2½ h.p. Calthorpe-Jap owned by a friend of mine had a Senspray carburetter, and at the handle-bar end of the control two small screw nipples were mounted. By adjusting these the owner could get dead slow running in free.

If the control levers have no means provided for adjustment, a throttle stop can easily be made by any amateur. The sketch illustrates an arangement which is entirely satisfactory, and which is well within anyone's skill. It simply consists of a nut, with one corner filed off, soldered to the throttle lever. A milled screw is then inserted in the nut, and, with the engine running if possible, this screw can be adjusted to give a nice easy tick-over, and then secured by a lock nut. By this small attachment all the worry of setting



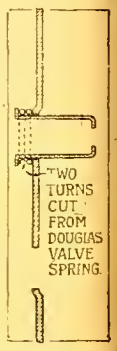
A home-made throttle control stop

the throttle lever to get slow running is done away with. The throttle is merely closed and the engine continues running quite slowly. A car driver takes his foot off the accelerator pedal and the engine ticks over in neutral. If this is a feature so much admired in cars, why are motor cycles not all provided with throttle stops?—Argon.

A DEVICE TO CURE CLUTCH SLIP.

THE sketch represents a section of the outer plate on the Sturmey-Archer clutch. These clutches have been known to slip owing to insufficient tension on the springs. The idea sketched is a simple and efficient means of overcoming this trouble.

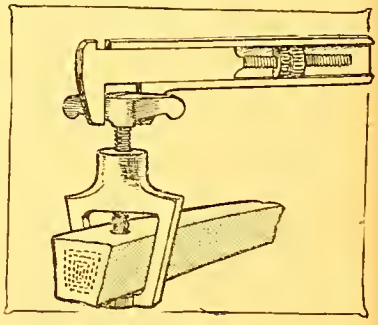
A Douglas valve spring is cut up into lengths of two coils each, and a length is slipped over each thimble on the clutch plate. The inside diameter of the spring is such that it is a nice fit over the thimble but will not pass the flange. It is clear that increasing the distance of the thimble from the clutchplate will automatically increase the tension of the clutch spring inside the thimble. This device has proved most successful in a number of cases.—K



To increase the spring tension.

MENDING BELT IN COLD WEATHER.

DURING the cold weather it may be found that the wing screw of the belt punch is very difficult to turn effectively. Good leverage can be obtained by opening out the jaws of a



Punching the belt with the aid of a spanner.

movable spanner and applying it to the screw as shown in the accompanying sketch, and there is something substantial to grip.—L.A.B.

Drip Feed v. Mechanical Pump.

"ONE of the Duds" has completely misunderstood my remarks anent drip feed *v.* mechanical oiling. What I said was "a plague on both of your houses." Far be it from me to denounce automatic mechanical lubrication in principle or theory: nobody is more desirous than I to see it incorporated on all motor cycle engines. But the theoretic advantages attaching to the drip and to the American substitute usually fail to materialise in practice. A wee, high-speed pump, composed of tiny pieces and possessing a finicky adjustment, is by no means always satisfactory in practice. I am sorry to say it, but the whole of my road experience suggests that the crude, reliable hand pump gives more general satisfaction than other systems.

Clutch Control.

THE same correspondent makes a terrible story of gear changing. If a gear box lends itself to changing "on the exhaust valve," why grumble? On my own gear box the two top ratios are close together (4½ and 5½ to 1): the makers recommend this change to be done on the valve, and I obey. The second and first gears are a long way off the top gears and each other (9½ and 14½): these are designed to be changed on the clutch, and I obey. But I do not often essay the contortions suggested by "One of the Duds," who draws a pathetic picture of me declutching with my right hand, throttling down with my left hand, and presumably giving the gear lever a bunt with my chin! No, siree! As on all carefully designed machines, my clutch has dual control, *i.e.*, a pedal, as well as a handle-bar lever: and, if I change gear on the clutch, I usually declutch with my *foot!* At the same time, not being hamhanded, as they call it in the R.A.F., I can manage with two hands the series of operations to which "One of the Duds" allots three hands. Let him consider. In this precise and dignified mode of changing, the gear lever is not moved until the throttle is shut, nor is the throttle reopened until the gear lever is well and truly home in its new notch. Thus, it should not be beyond the wit of any able-bodied man who has been plus one at ping-pong in his youth to use one and the same hand for throttle and gear. Seriously, why does our correspondent denounce changing gear "on the exhaust"? Given a suitable gear box with close-set ratios, surely it is ideal. I admit it gives you a jolt if the ratios are far apart and the gears do not snick in punctually.

Four-speed Gears.

"A" IS rather thrashing a dead horse when he begins to argue in favour of four gears. Being a whole-hogger like Horatio Bottomley, I proclaim quite fearlessly that I stand for infinitely variable gears and an automatic self-changing control. Till I can wring the Kaiser's neck I will make shift with a submarine commander, *i.e.*, I will put up with a beggarly four speeds. Let it be said that, subject to its natural limitations, there is no jollier sensation than bestriding a Zenith or a Rudge-Multi. The Rudge is too high-geared on bottom to be easy riding in stiff country. The Zenith handle-winding business is pleasant enough on ordinary roads, but is apt to feel difficult and look absurd on such a jaunt as the "secret route" of the last A.C.U. trials at Taunton, and, of course, neither transmission appeals to a man who is down on belts. But we all know that if a machine were produced which gave such a ratio-range as the countershaft Zenith, *i.e.*, 3½-11½, in conjunction with a good chain or shaft drive, that machine would be a "best seller." Such a millennium may still be far distant. In the meantime, a four-speeder is, like Paddy, the next best thing.

The "Gate" Change.

I DARESAY novices feel a little timorous of the four-speed gate, with its five separate lever positions. Actually, it is a great deal easier to handle than some of the freak three-speed lever locks on the market, some of which are misbegotten hybrids between a quadrant and a gate, and resemble an M, an N, an L, and a Z mixed up together. The changes from top to third, and from first to second, or *vice versa*, together with all changes from neutral, are childishly easy; only the changes "across the gate" from 4-3 to 2-1 present any complex wrist motion. The fact is that *any* gear change is easy when you are used to it.

The Truth about Three-wheelers.

THREE-WHEELERS represent the sacrifice to which poverty forces inclination. It is probably true that there has never been a three-wheeler owner who would not have bought a four-wheeler if he could have afforded it, just as no really honest man who can afford a Rolls-Royce drives a Ford and says he prefers it. If you want a four-wheeler, you have to pay for it. If you cannot raise the money, you must buy a motor bicycle or a sidecar or a cycle car. A Morgan, to my mind, is infinitely nicer than any sidecar: it is easier to steer, and it gives you much better protection from dirt and weather. It defeated rival cycle cars because its designer saw he could not undersell the light car without chopping off something. Some of his competitors chopped off quality. He chopped off two cylinders, two speeds, and one back wheel, whilst retaining quality. The result was that in 1914 he was selling a 'bus which cost £75 less than the average light car, whilst equalling it in accommodation, speed, and reliability. Its inevitable disadvantages were of a minor order, and sentimental character. Hence its fame. It will go on selling unless some genius produces a four-cylinder four-wheeler at the Morgan price, and that is hardly probable.

MORE PEACE PROGRAMMES.

Great Enthusiasm is manifest among the Majority of Traders at the Prospect of the Resumption of Business on Orthodox Lines.

B.S.A. PRICES FOR 1919.

THE first of the "post-war" prices to be announced are those of the B.S.A. Co. The model H, 4¼ h.p. (557 c.c.), with all chain drive, is seventy-eight guineas, and the chain-cum-belt model two guineas less. The sidecar is twenty-eight guineas. We are advised that while a certain number of B.S.A. machines are still being supplied for military purposes, the company is in the position to give delivery against general trade orders. The finish of the machines will be as the pre-war models.

TRIUMPH.

The well-known Baby Triumph will shortly be re-introduced to the general public.

EDMUND MOTOR CYCLES.

The 1919 Edmund motor cycle, with its well-known adjustable spring frame, will be a 2¾ h.p. model. The engine will be a J.A.P. single-cylinder of 292 c.c. capacity, and a countershaft gear of the Enfield type will be fitted. Messrs. Edmund and Co. will be in a position to deliver in December. Their works are at Crane Bank, Chester.

A PREMIER RUNABOUT.

We are now in a position to announce that the Premier proposition for 1919 will be a runabout. We are not permitted to give detailed particulars, but we have every reason to believe that the designers' aim has been to provide a stepping-stone between motor cycle and car at a reasonable price. The manufacture of spare and replacement parts for Premier motor cycles is to be resumed when circumstances permit.

THE CHATER-LEA PEACE PROGRAMME.

In the issue of the 21st we referred very briefly to the peace programme of Chater-Lea, Ltd. We are now able to give a few further details. Right up to the cessation of hostilities the company was engaged upon aeroplane engines and other important national work. The very fine limits allowed in the manufacture of these engines have provided excellent additional training for the staff, and will be a further guarantee of the high grade workmanship in Messrs. Chater-Lea's post-war productions.

It was stated in the last issue that the famous No. 7 motor bicycle and sidecar combination would again be placed on the market. This machine is one of the most satisfactory of its kind, and before the war it distinguished itself in numerous competitions. We may mention that in the A.C.U. Six Days Trials a Chater-Lea sidecar combination—the only one entered—gained the silver cup: a truly meritorious performance, as the course was an exceedingly difficult one.

Another machine will be the 2½ h.p. lightweight, two-speed two-stroke, which will be supplied in limited quantities.

In addition, the firm will be supplying component parts for motor cycles, light cars, and cycle cars. The complete vehicles of these types, however, will no longer be sold.

Mention must be made of the Chater-Lea patent terminal, an exceptionally popular fitting, the success of which has been amply proved. It has been adopted during the war by the Air Board, the Admiralty, the A.S.C., and numerous subcontractors, about two millions being supplied.

SIDECARS.

Messrs. Mills-Fulford—the Coventry sidecar manufacturers—have supplied several thousand sidecars to the Entente Governments, including British, U.S.A., French, and Italian. A large number were also sent to Russia. At present they are unable to execute orders from the general public, but every effort is being made to "change over." In the meantime orders are being booked for execution in the rotation in which they are received, but as the war model has been the well-known Corvette, this type will be the first to appear in the open market.

JOSEPH LUCAS, LTD.

This well-known Birmingham firm is still busy on important Government contracts, and there is no immediate prospect of a change on to the production of accessories for motor cycles and cars.

The new features foreshadowed are very interesting, and the firm's programme is full of good things. A combined dynamo-magneto set is one line, also a dynamo lighting set for solo machines, but we are not permitted to describe them, and Messrs. Lucas, Ltd., particularly wish to emphasise that they do not invite correspondence or enquiries from the riding public on these points at present. Directly circumstances governing production permit the development of the post-war programme, this firm can be depended upon to make big efforts to supply the market.

FORWARD MOTOR CO.

The diversion from aero plug contracts to the various motor cycle types is not an easy matter for this Birmingham accessory firm, although private orders are being dealt with as far as possible, it will be some time before any definite promise of delivery can be made. The latest plug list displays an excellent range of models with both mica and steatite insulations; long or short reach plugs, and a special waterproof type, are all good lines.

The Forward Motor Co. have a good stock of their well-known belt fasteners, and deliveries can be made almost immediately.

EMPIRE SIDECARS.

The Empire Motor and Sidecar Co., Great Charles Street, Birmingham, are hoping to be able to divert gradually from their present Government contracts to private orders. Nearly all the former models will be marketed, and early in the coming year deliveries should be possible. New models are in preparation.

BURBURY SIDECARS.

Messrs. T. Cadby and Sons, Farm Street, Birmingham, are endeavouring to place their former sidecar models before the public with as little delay as possible, but at the moment the continuation of Government orders prevents concentration on the regular line of work.

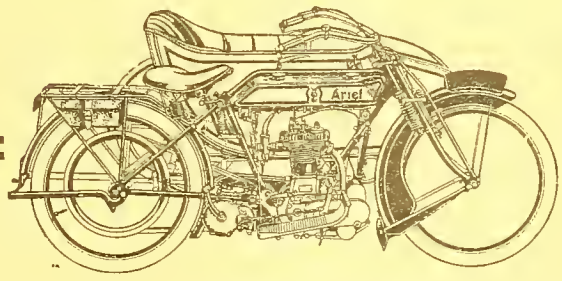
ARIEL

Our service to owners as good as our motor cycle.

We have always striven to make our service organisation as efficient as the Ariel machine. Evidence of our success is provided by the following testimony from an owner in the Midlands:

"It is extremely kind of you to take so much trouble over a small thing. It is gratifying to know that your service comes up to the general excellence of your products."

Art Catalogue post free from
ARIEL WORKS, LTD., 3, Bournbrook, BIRMINGHAM.



In answering this advertisement it is desirable to mention "The Motor Cycle." A13

BOWDEN WIRE MECHANISM

DURING the past four years nearly every War Department found some use for Bowden Wire, many millions of feet of which, together with the necessary operating parts, were consumed each year by the Allied Forces.

To meet the latest demands, we opened and equipped a factory in the United States.

We are now able to resume the manufacture of our pre-war products. The great extension of premises, plant, and machinery, effected during the war, makes it possible for us now to deal promptly with all orders.

We invite enquiries.

We also wish to express regret to many customers whose orders we have been compelled, by war requirements, to reject. It will be recognised that the position we were placed in made disappointment unavoidable.

Established 1897.

ORIGINAL MANUFACTURERS & PATENTEES

Bowden Wire Ltd:

LONDON

WILLESDEN JUNCTION N.W.10.

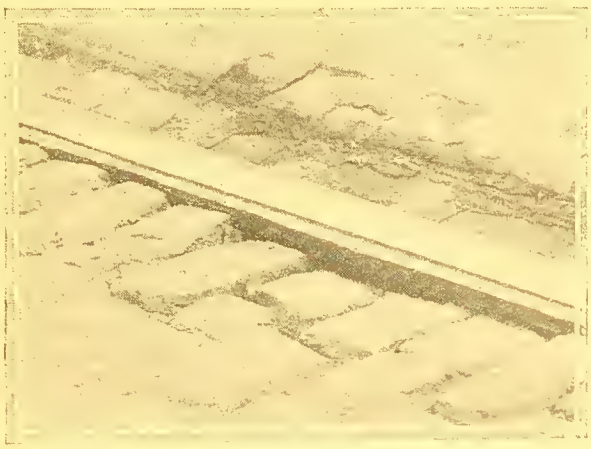
Godbolds

All over the country, roads are to be found in a similar state to the one shown above, requiring entire reconstruction.

A QUESTION OF GREAT INTEREST TO MOTOR CYCLISTS.

ON a recent occasion we had an interesting conversation with Mr. W. Rees Jeffreys, secretary of the Road Board, on the important problem of putting the roads into order now that the war is finished. From our conversation we learned many interesting facts, and among them one which is probably hardly realised by our readers, and that is that the fate of the Road Board is doubtful at the moment. After the passing of the Finance Act in 1915 the Road Board was only left with the funds it had in hand, and its income derived from the petrol tax was allocated to the State.

What will be done in the matter of roads depends largely upon what organisation the Government will establish or the possible continuance of the Road Board.



Tramway lines in the dilapidated state shown are a nightmare to solo riders on a dark wet night.

Few people have any idea of the enormous cost which will be entailed in making the roads suitable for the traffic they will have to carry in the future. For example, to restore the road surfaces to pre-war conditions would cost about £30,000,000, but, as Mr. Rees Jeffreys pointed out, that is not enough. Some roads will require entire reconstruction, and as there are 152,000 miles of roads in the country, a large number of which will have to be rebuilt and restrengthened at a cost of something like £2,000 a mile, probably another £30,000,000 will be needed.

Many of the bridges owned by the railway and canal companies are hopelessly inadequate for the burdens they have to bear at the present time, as can be seen by the diamond-shaped notices so frequently affixed to these bridges, which point out that they are not safe for heavy road vehicles. The cost of strengthening these would be probably another £7,000,000.

As we have previously pointed out, the Road Board's income was from taxation, and in 1915 sixpence a gallon tax on petrol brought in half a million. Now the petrol tax has been doubled, and the revenue it brings in is something like £2,000,000 a year.

The solution of the difficulty, Mr. Rees Jeffreys points out, is that the users of motor vehicles should press their case strongly, and should they do so there should be no difficulty in getting what they want. Labour provided in the course of demobilisation should be comparatively easy to get, and the placing of demobilised men on road repair and reconstruction would have an excellent effect, as it would distribute the labour throughout the country on urgent and necessary work.

The Problem of the Roads.—

In France there is a huge organisation of labour battalions under our most famous road experts, which have been doing little else than repairing the highways of France for the use of our victorious Armies. It would therefore not be difficult to bring this organisation over here.

The whole subject is one of enormous importance, and it is gratifying to note that the motoring organisations are already alive to the necessity of getting the roads in order, and it is to be hoped that soon something definite will be decided upon.

There is little doubt that the repair and reconstruction of the roads is one of the most pressing problems to be faced at the present time The prosperity of a country depends upon its roads. Transport is to be one of the most important features of the new era into which we are entering, and transport will indeed fare badly unless the main roads are made suitable and kept in good condition.

Mr. Rees Jeffreys, who has studied the question of roads all his life, has drawn up an excellent programme, a combination of central and local effort, and it now remains to get the scheme adopted by the Government.

As to what the Government will do as regards the reinstatement of the Road Board will engage the attention of all road users until the final policy is decided upon, for, as we mentioned before, the matter is an urgent one and no time should be lost by the Government in setting forth some definite plan of campaign so as to prepare the roads for the burdens which will shortly be put upon them.

WHICH TYPE?

An Invitation to Motor Cyclists to give the Specification of their Ideal Machine.

YOU HAVE IDEAS as to what constitutes an ideal machine for your own requirements. Fill in the form below and post it to the Editor of "THE MOTOR CYCLE," and so help us to show British manufacturers what the buying public has in mind.

20, Tudor Street, London, E.C.4. Hertford Street, Coventry.

FOUR GUINEAS WILL BE DISTRIBUTED AS FOLLOWS:

ONE GUINEA for a solo machine specification.

ONE GUINEA for a sidecar machine specification.

The awards will be made for the specifications which, in the opinion of the Editor, conform most nearly to the ideal designs compiled from the forms sent in.

ONE GUINEA for solo machine improvements.

ONE GUINEA for sidecar machine improvements.

The awards will be made for the best lists of suggestions connected with improvements in design and equipment.

The Editor's decision is final.

Please strike out the subjects which do *not* appeal to you.

Engine.—..... h.p. Long stroke or short stroke. Approximate capacity in c.c. ..... Two-stroke or four-stroke. Single, V twin, flat twin, or four-cylinder. Air-cooled or water-cooled.

Carburetter.—One or two levers.

Magneto Drive.—Chain, gears, or shaft. MAGNETO POSITION: Before or behind engine, central.

Lubrication.—Hand pump, semi-automatic drip, mechanical, forced feed, automatic, throttle-controlled, or petroil.

Gear Ratios.—One, two, three, four, or infinitely variable.

Transmission.—FROM ENGINE TO GEAR BOX: Belt, chain, shaft, gears. FROM GEAR BOX TO ROAD WHEEL: Belt, chain, shaft, with worm or bevel.

Type of Gear.—Epicyclic, sliding gear, dog clutch engagement, expanding ring, or expanding pulley.

Clutch.—Dry plate, wet plate, single or multiple, cork inset. CONTROL: Hand, foot, or both.

Frame.—Rigid or sprung. Diamond or open. Straight tubes or bent. Loop, girder, or duplex.

Forks.—Any particular type .....

Seat.—Sprung saddle, sprung saddle-pillar, or semi-spring frame (as Edmund and Bat).

Handle-bars.—Upturned, flat or dropped, semi-T.T. or D.R.

Brakes.—FRONT: In V rim, conventional shoes, expanding or contracting on hub. REAR: In V rim, on outside of V of rim, expanding or contracting on hub.

Wheels.—Detachable or not. Size of tyres ..... × .....

Lighting.—Dynamo, battery, acetylene generator, or gas cylinder.

Solo or Sidecar.—RIDING EXPERIENCE: ..... years.

Mudguards.—.....

Name and address .....

.....

NOTE.—If experience includes service as a D.R. or in the M.T. corps, please give some particulars.

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The A.B.C. Post-war Programme.

A REVOLUTIONARY BICYCLE AND A CHEAP CYCLE CAR.

FIRST TECHNICAL DESCRIPTION.

THE A.B.C. motor bicycle was rapidly acquiring a unique reputation when war broke out. During the past four and a half years its designer, Mr. Granville E. Bradshaw, has become famous as a member of that select band of brilliant young engineers who achieved miracles by extending the application of air-cooling from engines of 8 h.p. or so up to aero engines of 200 or 300 h.p. Motor cyclists have been anxiously waiting to hear what the firm's post-war programme might embrace, and there was a widespread apprehension that its energies might be wholly diverted into the aircraft industry. We are glad to announce that this fear has no foundation in fact. A.B.C. Motors, Ltd., and its allied concerns take the view that for the next few years aviation may be regarded as a very stormy sea. The possibilities of commercial aviation have yet to be demonstrated. Europe is full of all types of aircraft engines, many of which are brand new, will be sold cheaply, and are available for flight experiments. On the other hand, the world is clamouring for up-to-date cars and cycles, the road motor industry having been either stagnant or suspended for nearly five years. Here is a huge and profitable market in which firms with ideas may find a surer outlet for their productions.

A.B.C. Works, a Laboratory.

When the armistice was signed, the A.B.C. Co. found itself in an enviable position. The war had brought it into close association with several of the largest aircraft constructing factories in the kingdom, most of which will shortly be seeking employment for their expensive plant and large staffs of skilled employees. These firms include at least two whose names are household words in the R.A.F. Details of some sensational amalgamations may be announced shortly. The original A.B.C. works have been transformed into a laboratory for technical experiment and research. Three or four ideas are in various stages of progress, and fortunately the two notions which are most advanced and are earmarked for priority are those of interest to motor cyclists, who are assured both a lightweight cycle and a cheap cycle car of A.B.C. origin. As each design is perfected, it will pass to one of the associated factories for mass production.

To summarise the firm's policy, aero engine experience has rendered it possible to extract so much power from a given c.c. that it regards 500 c.c. as too much for a solo mount, and its motor bicycle will be appreciably smaller than this figure indicates. On the other hand, the firm does not believe in sidecar outfits, granting that it is possible to design a technically sound cycle car and to market it at a figure which competes with the high-powered sidecar outfit. Consequently, the 500 c.c. pattern disappears from its motor cycle catalogue.

It will be remembered that as long ago as September 30th, 1915, *The Motor Cycle* described and illustrated an A.B.C. flat twin of 250 c.c. which developed over 4 b.h.p. This engine was originally evolved for motor cycling purposes, and during the war it has been steadily manufactured for driving blowers and dynamos, for starting seaplane engines, and for a variety of auxiliary Service uses. Needless to say, Mr. Bradshaw has perfected it during the last 4½ years, and the armistice finds him ready with a somewhat similar engine thoroughly adapted for solo touring work. At the present moment the first sample engine has completed sixty-one hours' running under full load on the stand, and is expected to pass into production as soon as the destruction bench tests are completed, and the outdoor staff have had time to test its manners under actual road conditions.

The "Firefly" Lightweight.

The public will expect to find strong reminiscences of aero engine practice in all the post-war A.B.C. engines. The "Firefly," as the little fellow is christened, is no exception. It has one-piece steel cylinders with wafer fins, machined to the closest dimensions inside and out, and is absolutely symmetrical from every point of view, so that no distortion—the modern name for the ancient bugbear of overheating—can occur. The pistons are of aluminium, deeply recessed at the waist to avoid gumming, and bantam weights on the scales. Both inlet and exhaust valves are of the overhead type, machined from unbreakable aero steels. The connecting rod big ends thread over the cranks of the one-piece crankshaft; the crank pins and the "eyes" of the big ends are hardened, and the annular spaces between crank pins and big ends are filled with rollers, located and secured by split distance collars. This type of big end requires oil only as a protection against rust, and permits the lubrication to be cut down to the minimum.

Mechanical oiling and an automatic single-lever carburetter are provided. The induction pipe is heated from the exhaust box, and a good mixture is obtained with an extraordinarily small jet with consequent economy of fuel.

The final c.c. will be determined when the road testers report on the top gear climbing of the experimental batch of machines. It is intended to combine a maximum speed of 60 m.p.h. on the level with good top gear climbing capacity. In any case the engine will be well below the 500 c.c. mark, and its exact size will be determined irrespective of pre-war conventions; if necessary a special size of engine will be turned out for the heavy competition programme which is contemplated.

Now comes a surprise for our readers. In 1914 everybody liked the flat twin engine, but everybody noticed how awkward it was to house in a normal cycle frame, and how inevitably the front cylinder was better cooled than the rear. Mr. Bradshaw has cut these Gordian knots by boldly mounting the Firefly athwart the frame. The crank case is mounted low down at the front of what an Irishman might term a "square-loop" frame, with the tiny cylinders pro-

jecting outwards to the right and left, and the crankshaft axis in line with the track. The overall width of the engine has been reduced to such a figure that if the machine should fall damage cannot occur, nor do the cylinder heads appear to project or seem in any way obtrusive. This, of course, is accounted for by the fact that war experience has rendered a "tabloid" power unit practicable.

Heterodox Features.

The gear is enclosed in the flywheel, and embodies three forward gears on the epicyclic principle. The whole revolves solid on top gear, and furnishes the maximum flywheel effect for high gear work, whilst the lower gears have the effect of temporarily lightening the flywheel, which is desirable for "revving" on a low gear. From the rear of the gear box a propeller-shaft drives a ball bearing countershaft, through bevel gearing, and the final drive to the rear wheel is by enclosed chain. Provision is made on the countershaft for driving a speedometer and an electric lighting dynamo. A sleeve mounting for the latter is provided in an alternative form of top casing for the bevel gears, and this mounting can be substituted at any time after purchase. The entire power unit, including the gear box, can be taken out of the frame after withdrawing three bolts.

The frame is also by no means devoid of originality. Mr. Bradshaw frankly runs counter to ancient prejudices when he denounces the fetish of a straight tube frame. He holds that a rigid frame conveys the maximum amount of vibration to the rider, holds the road badly, and is apt to fracture when the tubes butt into the lugs unless these parts are built absurdly heavy. The Firefly frame is built up of two tubes. The upper tube is sharply slanted backwards, and has a downward turn towards the rear, giving extra clearance for a long coat or a skirt. Lugs are brazed to each end of it, and into these lugs the lower or "loop" tube is butted. The loop is given rather a squarish contour fore and aft of its bottom run. As the engine weighs under 30 lb. the designer can afford to mass strength in the vital parts of his frame, and simultaneously to allow a little natural spring between these points. The frame appears to serve these twin ideals well.

It is efficiently sprung fore and aft, flat laminated springs being used at both ends. The fork more or less resembles the well-tried 1914 A.B.C. type. The rear springing is quite new. The hinged joint between main and rear frame is equipped with roller bearings, and the hinge at the base of the carrier strut with encased ball bearings. It has no "thick end," but is "stepped" both above and below.

The machine adds a new point to the brake controversy, for both brakes are of the cone type, now coming into favour on cars in America, but as yet practically unknown in this country. We are unable to illustrate them at the moment, but they resemble an ordinary friction cone clutch, one cone being mounted on the spindle, and the other on the wheel. The advantages claimed by the American originators are that they give a maximum frictional area in a minimum space, and are practically self-adjusting for wear, as the male cone slides deeper and deeper into the female cone, as wear occurs.

No kick-starter is fitted, the machine being designed to start in a yard or two by the "paddle-off" method, a hand clutch being provided in case it is desired to take a rider on the carrier or to pull a sidecar. Owing to the absence of internal flywheels, the restricted lubrication required when the crank case is almost devoid of plain bearings, and the piston clearance described above, "gumming up" does not occur on this engine, and even an elderly man can easily start it.

The machine should prove economical to run; 2½in. tyres are fitted, as the best insurance against those aggravating tyre stops which befall the most reliable machine. A special induction system, which we have no space to describe in this issue, permits power to be obtained from an abnormally small jet, and judging by bench tests the fuel economy should be phenomenal. The bearing and piston design renders floods of oil in the crank case as unnecessary as they are always undesirable. In the sixty-one hours' bench testing above-mentioned, the average oil consumption has been just under 4 oz. per hour, equivalent to something like 2,000 m.p.g. on the road at high speed.

In view of the demand from old clients and agents, numerous firms would already have passed this machine into production; but, as the output is to be on a very large scale, it has been thought prudent to test the main components to destruction as a preliminary. The engine is to complete 100 hours on the bench, after which a score of machines are to be given a heavy gruelling on the road. Meanwhile the gear boxes are to do fifty hours on the stand on each separate ratio, concluding with another fifty hours, during which a special trip mechanism will make brutal gear changes every minute. The machine will then be marketable with the same confidence which its sponsor firms hope to inspire from their new customers. It is hoped that the bench tests will be concluded early in December, and production will not be delayed a moment longer than is inevitable, as several thousands of aircraft workers are waiting to pass into peacetime employment.

A Welcome Innovation.

Writing before we have enjoyed personal road experience of the new design, we are bound to welcome its appearance, even on paper, as a fact of some importance in motor cycling history. Our veteran readers will remember that on previous occasions a machine which outraged all motor cycling conventions has proved a very healthy stimulus to the sport, hobby, and industry. The Douglas and the Scott are notable examples. We hope the experience of the next few months will endorse the view that the new A.B.C. will mark a somewhat similar epoch. For the moment we can only say that it is the bantling of a brain which has achieved real distinction in war engineering, and, having discussed the machine in detail with its designer, we know that he has a sound engineering principle for each departure from orthodox practice.

It is perhaps needless to add that the machine is a lightweight de luxe, and that at the present rate of wages and cost of material it will not be cheap as compared with pre-war standards. There is, nevertheless, every reason to hope that prices will drop sharply when industry settles down to its new occupations; and in the meantime the price will compare quite satisfactorily with market standards.

CURRENT CHAT

SPECIAL FEATURES

THE A.B.C. POST-WAR PROGRAMME. THE FLAT TWIN WOOLER.
PROBLEMS OF THE ROAD.

TIME TO LIGHT LAMPS

GREENWICH TIME.

Nov.	28th	4.25 p.m.
,,	30th	4.24 ,,
Dec.	2nd	4.23 ,,
,,	4th	4.22 ,,

The Prince of Wales's Fund.

The Prince of Wales's Fund has reached a total of £6,449,978. Of this sum, £3,919,890 has been allocated to date for distribution for relief.

Sociable Sidecars.

Several sociable sidecars with inside controls are running about the Midlands, but it is not anticipated that makers will market them.

Spring Frames.

It is safe to say that fully ninety per cent. of the manufacturers are considering the spring frame problem.

The Military A.J.S.

Although the top line of the tank on the military model A.J.S. is parallel with the ground, the diagonal top tube, visible in the pre-war models, is still retained.

Which Type?

To those of our readers who overlooked our announcement, we repeat our invitation to fill in the form in this issue in accordance with their ideas as to what constitutes the ideal machine. We also repeat that extra forms will be sent on receipt of postcard, if any reader wishes to interest his friends in the scheme. The last date for receiving forms is Thursday, December 5th. Overseas specifications will be considered separately at a later date.

Petrol Restrictions—Further Concession.

The Automobile Association is informed by the Petrol Controller that the concession recently announced permitting petrol licence holders, on and after December 1st, to use their vehicles of any type for all purposes within a radius of thirty miles of the place of residence or business of such licence holders will apply to motorists who do not hold current petrol licences.

Petrol properly obtained and stored under old licences can be used in accordance with the new arrangements, but in those cases where petrol has not been obtained under licence it will be necessary to inform the Petrol Control Department how the fuel was obtained. If the information given is satisfactory the Controller will issue a special permit authorising such unlicensed petrol to be consumed. The Automobile Association will assist motorists in obtaining such permits.

Emancipation Day!

The paragraph appearing in Current Chat in the issue of November 21st contains a suggestion which will doubtless appeal to many of our readers. It will be a great relief to be able to get on to the road again, and a crowd of happy motor cyclists, their machines decked out with flags, at a pretty rendezvous like "The Hut" Hotel, Wisley, at noon on Sunday next (December 1st), cannot fail to attract attention, and will be a fitting, though quite informal, celebration of the first joy-riding since the armistice was signed.

It must be borne in mind, however, that the lucky motor cyclists will be only those who are or have been actually holders of motor spirit licences, the complete release of petrol for all purposes not having yet materialised.

THE A.B.C. CYCLE CAR.

First Announcement.

This cycle car is frankly a profession of unfaith. It proclaims a disbelief in the sidecar. No 500 c.c. A.B.C. bicycle will be made, and the firm is not anxious to see sidecars attached to the new Firefly model (which is described in this issue), though it can unquestionably pull them. In the A.B.C. programme there is a considerable gap between the Firefly and the 1,200 c.c. cycle car, which will be listed at 100 guineas, if the wages of labour and cost of materials do not disappoint its sponsors. A perusal of the simple specification suggests that in any case a low price should be practicable. The engine, of course, is a flat twin of approximately 1,200 c.c., built and designed on aero principles, and developing some 12 b.h.p. This will be mounted horizontally across the front of a 4½ cwt. chassis, with the valve chests protruding on each side from a cowling resembling the nose of a fuselage.

In technical details this engine is a bigger edition of the Firefly. It is rather in the transmission that the cycle car chassis is revolutionary. The usual gear box, differential gear, and clutch are all compressed into a novel form of friction drive, which we shall describe in our next issue. This cycle car will not go into production until the motor bicycle is passed as absolutely perfect; but, unless unexpected difficulties are encountered during reconstruction, we may hope to see it on the road next spring, when it bids fair to prove a formidable competitor of the sidecar de luxe. The most superficial glance at its design indicates to us that it is a true cycle car, and can be built far more cheaply than any car type of vehicle. There is not a gear of any kind in the entire transmission, and on paper the fraction drive promises to be satisfactory.

Engine Units.

New firms will enter the motor cycle and the engine unit trade immediately the cessation of war work permits.

A Reminder.

To those riders who have allowed their driving licences to run out, we recommend that they renew them at once.

Flat Twins.

The popularity of the flat twin in the trade is increasing. It is not improbable that half a dozen new machines of this type will be on the market shortly.

Motor Trade Shows.

The Society of Motor Manufacturers and Traders has decided to organise forthwith a full series of exhibitions. The annual touring car exhibition will be held at Olympia in November, 1919, and the series of international aero exhibitions will forthwith be resumed.

Appreciation.

A correspondent whose letter appears in this issue says: "May I congratulate you on your Special Issue and the way you have carried on during the last dark four years of nightmare." We return thanks, and are glad to know that our efforts have been appreciated.

Well-known Contributor to stand for Parliament.

At a general meeting of the members of the North Paddington National Party, Capt. Wilfred Gordon Aston, R.A.F., of 26, Blomfield Court, Maida Vale, W., was unanimously adopted as the party's candidate to contest the borough of North Paddington at the coming General Election.

Licences.

Undoubtedly quite a large number of motor cyclists who may now use their machines have not paid their Inland Revenue tax for 1918, and will hesitate before doing so since only another month remains of the year. Considering that holders of licences in 1917 were deprived by the petrol restrictions of the use of their machines for a portion of 1917, it is to be hoped that the authorities will not be too exacting.

Petrol for Discharged Soldiers and Sailors.

The Petrol Control Department have expressed their willingness to consider most sympathetically applications from discharged soldiers and sailors who want petrol licences for strictly necessary purposes. The Auto Cycle Union, of 83, Pall Mall, London, S.W.1, will be pleased to correspond with and send the necessary forms to any man desiring a licence for petrol for a motor cycle.

The G.N. Cycle Car.

We understand that the new model G.N. will not have belt drive.

Lighting and Ignition.

Quite a large number of makers are considering the combined lighting and ignition unit for their new models.

Heavy Fuel.

We came across "Archie" Cocks, the Clyno exponent, last week. He was running his sidecar machine on a mixture of tar oil and paraffin by means of a vaporiser of his own design.

Second-hand Machines.

Motor cyclists are eagerly turning to the second-hand columns, hoping to "pick up something" ready for the good time next year.

Economy Tests.

Petrol economy tests look like being popular when motor cycling commences in earnest, more especially if petrol prices remain inflated.

Good News.

After January 1st the Petrol Control Department will consider applications from private owners who do not hold licences and for increased allotments to present licence holders.

Four Cylinders.

We recently saw a water-cooled four-cylinder machine of a well-known make which had been designed and built specially for war service. There is no prospect of its early appearance on the market.

Two Good Chances.

We know of two vacancies in a motor cycle factory. One is an exceptionally good post, which could be filled up by an energetic technical man; while the other is an opening for a good organiser. Readers who think they might fill these posts are invited to write to the Editor.

Imports and Exports.

The imports and exports of motor cycles and parts for the month of October show a big decrease on the figures for the similar period last year.

IMPORTS FOR OCTOBER.

	1918	1917
Parts only	£182	£3,156

EXPORTS FOR OCTOBER.

	1918	1917
Machines	£41,791	£234,545
Parts	£23,837	£33,724
Total	£65,628	£268,269

As Usual.

We heard of an enthusiastic sidecarist who risked a hundred miles pleasure ride last week—the first for years. He generally prides himself on always being fully prepared for emergencies (lucky dog!), and when he met a fellow motor cyclist stranded on a lonely stretch of road he immediately offered help.

"Left my puncture repair outfit at home," said the disconsolate one.

"Ah! we will soon put you right," replied the cheery Samaritan, and turned to get his solution and patches.

But he, too, had left his repair outfit at home—a nice commencement of the revival of motor cycling for pleasure, we *must* say.

The Next T.T.

Undoubtedly the few motor cycle manufacturers who have been engaged upon aero engine work will have learnt some valuable lessons for the next T.T. Featherweight reciprocating parts will be in evidence.

An Imperial Memorial Scheme.

We publish this week a letter which, although it does not deal with the subject of motor cycling, will nevertheless be of interest to motor cyclists and to all patriotic members of the great British Empire. The names to be found at the foot of the letter are in themselves a guarantee that subscriptions will be put to a proper use, and we commend the objects of the Veterans' Association to our readers with every confidence.

The Institution of Automobile Engineers.

The third meeting of the session of the Institution of Automobile Engineers will be held on Wednesday, December 4th, at the Royal Society of Arts, John Street, Adelphi, W.C.2, when Mr. A. E. Berriman will read a paper on "Analyses of Some Engine Tests."

Cards of invitation to the meeting may be obtained on application to the Secretary of the Institution of Automobile Engineers, 28, Victoria Street, S.W.1.

Stolen.

One of our readers has had a 1913 B.S.A. motor cycle stolen. Except for the semi-T.T. handle-bar, all parts usually plated are black. It was at first a single-speed free engine model, and has the original B.S.A. clutch in the rear hub, but it is now fitted with a Jardine four-speed gear box (chain-cum-belt drive). A Dunlop tyre is fitted on the front wheel and a Goodyear on the rear. It is equipped with a black finished P. and H. acetylene head lamp and a speedometer. The general condition is good.

The machine was stolen on or about November 3rd from the garage of Messrs. W. Cliff and Sons, Well Hall. Anyone seeing this machine should communicate with the owner, Mr. E. W. Lambert, 72, Dunvegan Gardens, Eltham, London, S.E.9.

Government Machines.

The cessation of hostilities does not necessarily mean that the Government will require no more motor cycles. So far as present indications go, it appears that they will require more for "clearing up."

An Appreciation from a Canadian Reader.

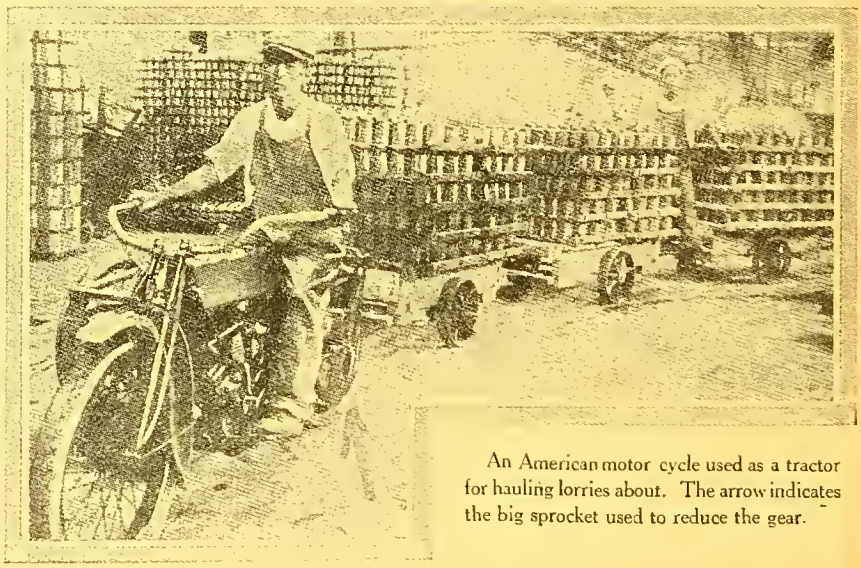
A reader from Alberta, Canada, writes: "I appreciate this little paper very highly, and always look forward to its receipt with much interest, especially to those portions referring to the combinations of the various firms in the old country for the purpose of placing their machines on the markets abroad."

Some Juice!

A member of our staff recently drove his 5·6 h.p. combination from Coventry to London and back. The journey to Town was done on No. 3 war spirit, and the two gallons just did the ninety miles. Returning, he put two gallons of No. 1 pre-war Shell into the tank (what sacrilege!), had a ten-mile run round Hampstead, did the journey to Coventry, and has since done a further ten miles or so. Emptying the tank, he found a pint and a half left. Now then, you mathematicians!

Welcoming Them Home.

The committee of the Allied Motor Clubs of Birmingham and district is arranging a grand "reception" for those serving in the motor sections of the services when they return home. This reception will take the form of a smoking concert at the Grand Hotel, Birmingham, and a trophy will be presented, to be competed for annually by the local clubs, which will serve to perpetuate the memory of those who have fallen. Details have not been completed, but the organiser, Mr. S. Kempson-Jones, at the Cameta Rubber Co., 93, John Bright Street, Birmingham, will be glad to hear from members of H.M. forces on their return, and to have the names of the fallen from relatives. The date will be published later when the scheme is more advanced.



An American motor cycle used as a tractor for hauling lorries about. The arrow indicates the big sprocket used to reduce the gear.

THE MOTOR CYCLE

AVIATION SECTION

New Passenger-carrying and Height Records. Royal Aeronautical Society's Lectures.

Crippling the Hun.

The armistice terms include the handing over by Germany of 2,000 'planes.

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Passenger Record.

The passenger-carrying record has been again broken. A Handley-Page recently flew over London with a party of press representatives, including ten ladies—forty-one passengers in all.

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First Tickets for Aerial Journey to Paris.

Among the purchasers of the first five tickets sold for the aerial "bus" journey to Paris under the auspices of the Aircraft Transport and Travel Co. are Mr. E. Manville and Mr. Percy Martin, chairman and managing director respectively of the Daimler Co., Ltd., Coventry.

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Height Record Beaten by an American Airman.

During the war the French Aero Club has abstained from announcing record performances in the air, although it was an acknowledged fact that the records for height, speed, and weight-carrying could have been beaten: thus the height record had been carried to 8,000 metres, at least a year ago, without any mention of it in French journals. The U.S.A., according to *L'Auto*, has not been quite so scrupulous, as it was announced on the 15th inst. that the height record had been officially broken that day by Capt. Schroeder, an American pilot, on a Bristol biplane fitted with a 300 h.p. Hispano-Suiza engine. Capt. Schroeder attained a height of 28,900 feet, or approximately 8,808 metres.

R.A.F. Chevrons.

The rule forbidding the wearing of chevrons by the Air Service is to be abandoned.

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One Fill-up.

The distance which a modern 'plane can travel without replenishing its fuel and oil tanks is estimated at 1,200 miles.

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Women's Air Force.

It is regarded as not unlikely that the Women's Royal Air Force may presently become a permanent service, and that women who signed on for the duration of the war may have the option of remaining in the Force under new conditions.

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Aeronautical Lectures.

The Royal Aeronautical Society has arranged for the following series of lectures to be delivered during the coming winter session:

December 11th.—Central Hall, Westminster, S.W. Lecturer: Mr. C. Grahame-White. Subject: "Civil Aerial Transport: Is it Practicable, is it Safe, and is it Profitable?"

January 8th.—Central Hall, Westminster, S.W. Lecturer: Mr. F. Handley-Page, C.B.E. Subject: "To Constantinople and Back by Aeroplane in War-time."

January 15th.—Royal Society of Arts, Adelphi, S.W. Lecturer: Dr. L. E. Stamm, R.A.F. Subject: "Medical Aspects of Aviation."

March 26th.—Royal Society of Arts, Adelphi, S.W. Lecturer: Lt.-Col. T. R. Cave-Brown-Cave. Subject: "Lighter-than-air Craft."

Australian Timber for Aeroplanes?

At the instance of the British and Commonwealth Air Boards, tests are being conducted in Western Australia of local timbers thought to be suitable for aeroplane building.

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Brand New German Aeroplane Astray.

A brand new German aeroplane, carrying a machine gun, without munitions, landed near the village of Arolles in France. The pilot, who has been interned, said he lost his way.

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Aeroplane Makers' Holiday.

Employees of the Royal Air Force establishment at Farnborough have been granted a holiday from Saturday last until to-day (Thursday) with pay, in order to mark the signing of the armistice.

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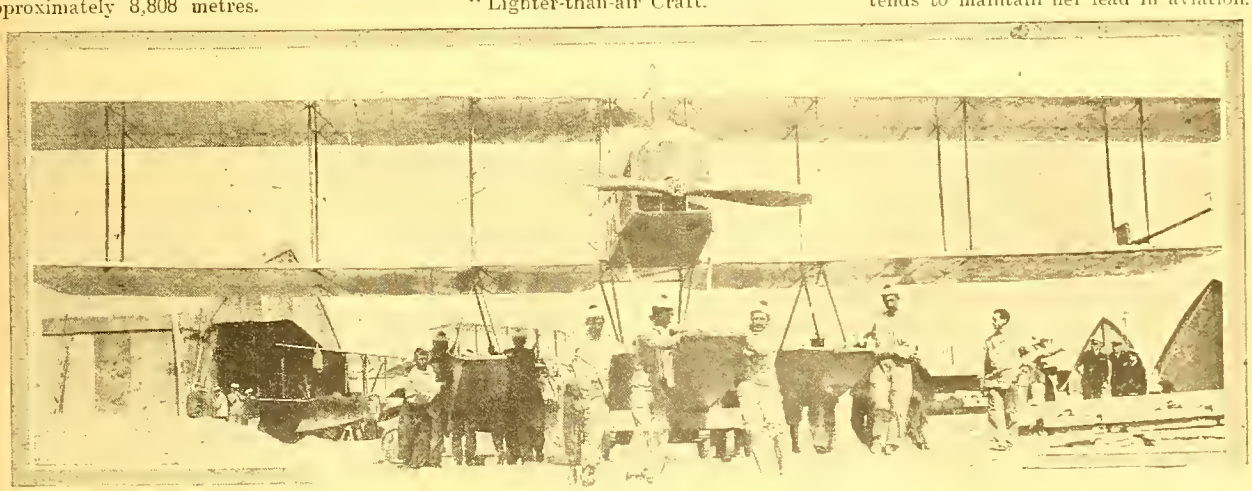
Aerial Mails.

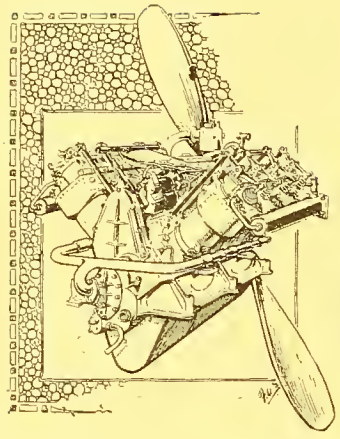
We understand that the Postmaster-General is developing a scheme for the delivery and despatch of letters between London, Dublin, and Edinburgh by aeroplane.

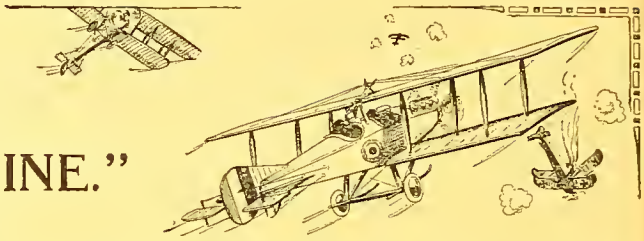
The first report of the Select Committee on Transport, which deals solely with Ireland, suggests the establishment of a port in the North from which improved fast train services for passengers, and air services for express mails, may be found feasible.

The indications are that England intends to maintain her lead in aviation.



On the Mediterranean coast. Italian sailors bringing in a large seaplane.





A "PILOT'S ENGINE."

By TORQUE.

WHEN war broke out, you could count the number of decent British aero engines on the fingers of one hand. According to certain proud designers, on the thumb. According to other unenterprising engineers, you did not even need the thumb. Anyhow, that is all changed now. The name of good, home-designed, home-built engines is at last Legion. Some of them resemble an ordinary motor car engine as reflected in those advertising mirrors labelled "After dining at Peace and Plenty's." Some of them resemble a pack of 8 h.p. o.h.v. Japs, laid cheek by jowl, and multiplied to the *n*th power. Some of them remind you of a starfish, except when they start, when they become a hybrid between a blur and a *rafale* of French 75 mm. guns. Officially, the budding pilot is instructed to classify them as verticals, V's, rotary radials, static radials, and "secrets." Our irreverent Army prefers a vocabulary of its own. There is the "secret," usually known as a "hush-hush," or possibly a "swish." The most interesting of these engines is the—(D.O.R.A.—umpteen million horse-power, eight-stroke supercharger.) Then there is the "brass hat's engine." This is usually designed by somebody quite unknown to the trade, but richly blessed with acquaintances in the Strand. It scales .78 lb. per b.h.p., runs on paraffin, and dominates next year's programme, until the collective staffs of the twelve leading motor car factories have failed to coax it to run for more than two minutes without tying its crankshaft into lovers' knots.

Then there is the manufacturers' engine, for which the trade is sighing. It has not been invented yet, but every factory will go ahead with one as soon as it ceases to be "controlled." A factory staffed exclusively by women will turn it out at the rate of ten per diem, using no tools except files and screwdrivers.

A very popular engine indeed is the "ack emma's engine." You may know it because it can come in from the closing patrol at dusk, and complete its overhaul by 11 p.m., so that the air mechanics can get to bed. Contrast this with the X—— engine, a contraption which cannot be got out of the aeroplane with less than eight hours' work: which can be timed in eighty-nine different ways, of which eighty-eight are wrong: and which takes three weeks to overhaul. If the selection of engines depended on the a.m.s., many that are first would be last, and the last first. Then, of course, there is "my engine." It only weighs 7 oz. per h.p. It will run on water, though it prefers beer. It is as cheap to make as a packing case: it never, never breaks down. Why isn't it used in the R.A.F.? Oh! the old story. I'm not a grafter. No pull, you know. Never stood a ragtime major from the Hotel Bolo fizz in my life. I'm just honest, patriotic, and poor. Come and have a drink, and I'll show you exactly how it works, old man?

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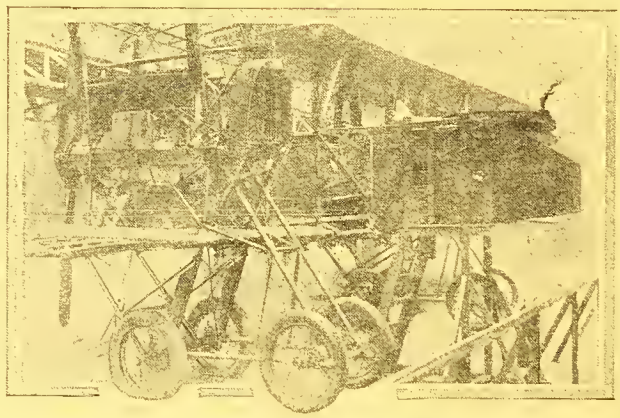
Still, when all is said and done, the engine of engines, the pukka air engine, the super engine of the whole crush, is the *pilot's engine!* When you are 20,000ft. up all on your little lonesome, over Hunland or the North Sea, or the Heligoland Bight, or the jagged peaks of the Balkans, or the yowling yellow sands of Mesopot, you don't care a copper asbestos washer what the brass hats think of the engine just in front of your cockpit, or what she cost, or how long it takes a squad of air mechanics to dismantle her, or whether she's a radial or a rotary or a boiled beer turbine. Two things you ask: One is revs, the other is rhythm. That full-throated rhythmic bellow must not pause or falter. The stentorian B-r-r-r-r must never dislocate into a tutter-tut-tutter-bang-split-crash. That evil little dial must not sink its needle 100 r.p.m. at a time with the engine controls remaining "as you were." Above all, whatever shears or melts or freezes or gets shot away, what is left of the engine *must* carry on. She may get red hot. Both mags may have been Archied clean off. Half the cylinders may have blown off, the radiator holed, and the oil tank hanging by its feed pipe. But the manful residue of that once perfect engine must carry on at cruising speed, and flutter you home somehow. A veteran Balkan pilot has a yarn about getting back from Nish with approximately 42% of his old Canton-Unné engine shot away, and the rest seized up because his oil tank had dropped off. Do I believe it? Well, I did when he first told me; but I confess it was on a "guest night." About 1 a.m. Well, well! Boys *will* be boys, won't they?



A Gotha which bombed London reconstructed and to be seen at the R.A.F. Exhibition, Agricultural Hall.

THE R.A.F. EXHIBITION.

SOME IMPRESSIONS.

IT seemed, indeed, strange to be proceeding again to a show at the Agricultural Hall, Islington, but the scene is a great contrast to that viewed on previous occasions.

First one passed an armed sentry, and then the admission ticket was taken by a smart W.R.A.F. girl. Gone was the yelling crowd of vendors of catalogues, boot polishes, and other sundries not strictly in accordance with the general object of the exhibition, and instead there are rows of enemy aircraft, engines, samples of Boche radiator work, etc.

The main hall is a great disappointment, as the "exhibits" consist of Army Aeroplane Stores screened off from the gaze of the inquisitive. To the casual observer, perhaps the Mercédès engine from one of the raiding Zeppelins brought down in England is the most attractive.

In the gallery, however, practically every make of German aeroplane is shown, and of these many have been badly damaged and show plenty of British bullet marks, while two have been cleverly repaired and reconstructed by R.A.F. mechanics. The show is naturally of great interest to the student of modern aircraft, and probably the exhibit which attracts the most attention is that of an ingeniously reconstructed "crash" of an Albatross brought down from a height of 6,000 feet. The propeller is broken, the tank stove in, the wings are smashed beyond recognition, while the reconstructed pilot looks far from happy.

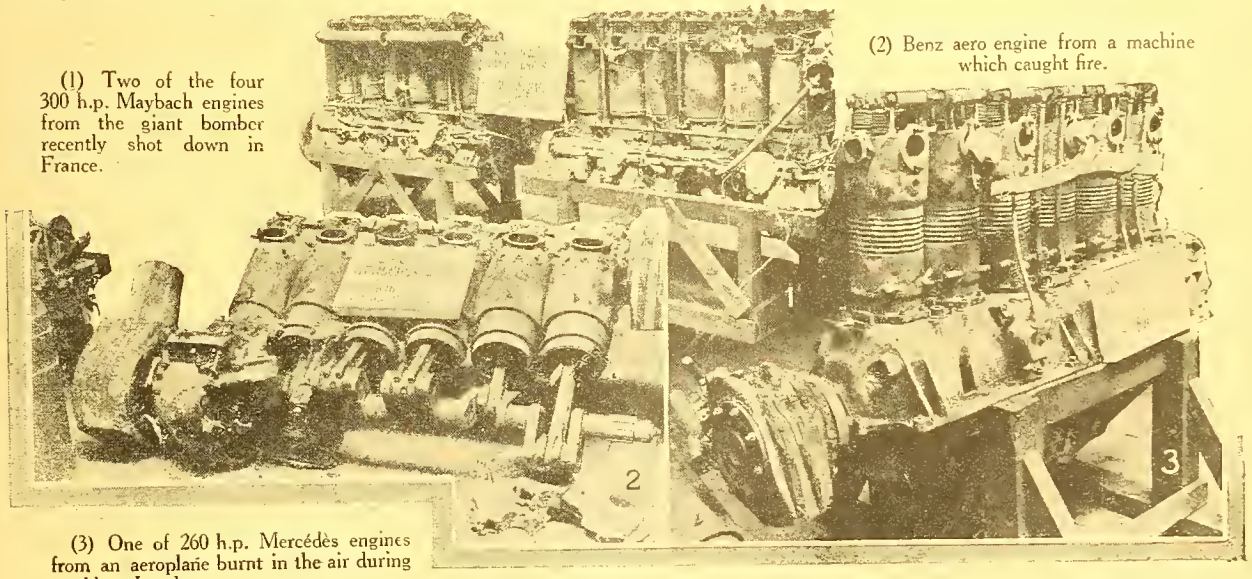
Quite the strangest machine in the hall is the all-metal Junker with corrugated aluminium wings and an interesting system of cross-bracing, in which the stays are both riveted and welded. The object of the all-metal construction is naturally to avoid fire, but though there is nothing which would actually burn, in the event of the tank catching fire the planes would melt. Close to it we noticed a strut from a giant four-engined Gotha—a machine which was brought down in France but set on fire by its crew. On the wall is a diagram of the giant Gotha, the ordinary Gotha, and the Camel which brought the first-named down.

There is a reconstructed two-engined four-seated Gotha, one of those which bombed London, brought down in Essex. The wings have a span of 80ft. The Friedrichshafen is somewhat of the Gotha type, having a span of 78ft., and is likewise a four-seater with two engines. This machine was brought down in France. Other attractions were Parabellum machine guns, bomb sights, and other instruments.

The exhibition will remain open until January 18th.

A German derelict.

A reconstructed crash. The machine was an Albatross D5. Note the pilot's leg driven through the fuselage, and the two Parabellum machine guns.



(1) Two of the four 300 h.p. Maybach engines from the giant bomber recently shot down in France.

(2) Benz aero engine from a machine which caught fire.

(3) One of 260 h.p. Mercédès engines from an aeroplane burnt in the air during a raid on London.

OVERSEAS SECTION.

A Commentary based upon Practical Experience and a Study of Overseas Opinions.

The All-fuel Machine. As has many times been pointed out, manufacturers turning out special models for Overseas use would do well so to equip the machines that a heavy fuel could satisfactorily be used. Such provision does not necessitate any wide departure from standard practice, nor need it detract in any way from the results obtainable with petrol. It is merely a matter of so arranging things that, should necessity demand, a heavy substitute could be used without the risk of material damage to the engine.

The necessary features may be set down as follows: Divided tank, the petrol partition occupying, say, one-third of the fuel capacity, a hot air intake which could be turned away from the cylinder when not required, and thus made to function as an air scoop, and thirdly a drain tap at the bottom of the float chamber.

Even if we do all get a fair "ration" of petrol it is quite on the books that a big quantity of the heavier stuff will have to be used to supplement it, and will help us out till the lighter fuel is obtainable in big quantities.

We suppose there are very few riders who would use heavy fuel if petrol were in any way obtainable, yet recent experiences have taught us that even lamp oil is preferable to no fuel of any kind. Small two-stroke engines usually run quite satisfactorily on "substitutes," and are doubtless better adapted to their consumption than are four-stroke engines. This is probably due to the churning up the charge undergoes in the crank case of the two-stroke ere it reaches the cylinder, and further to the warming up it receives while passing along the transfer, and even while in the crank case.

A Triumph rider in the mountainous country of South Africa.

It is quite conceivable that larger two-stroke engines than are to-day commonly employed will become popular for Overseas use, as the two-stroke engine has many things to recommend it for use under pioneer conditions—quite apart from the fuel question.

Mechanical Silence. It is an acknowledged fact that many American machines score over the every-day Britisher on the point of mechanical silence. There is no mystery about this. Apart from good design, careful machining has everything to do with it. Many of the best known Britishers are appallingly roughly finished as regards their valve gear, etc., when compared with the best Americans, and unnecessarily massive reciprocating parts are used, which add to the general clatter of things. Over and above this there is, of course, the question of volumetric efficiency. It is a very much easier matter to make a large engine of low volumetric efficiency that will run silently than it is to make a small engine of high volumetric efficiency that will run silently. In the first case, we have small valves and cams, permitting a progressive rise and fall; in the latter case, we must necessarily have large and heavy valves and corresponding parts and stiff valve springs.

Thus the Americans, with their large engines, can afford to make considerable sacrifice to obtain mechanical silence, etc., while the aim of the Britisher has been rather to obtain maximum power from a moderate capacity.

We have heard it said that before we can obtain silence and those other admittedly superior points of the American, the volumetric efficiency of our engines must come down, but this would hardly seem to us to be working in the direction of ultimate perfection. Leave the volumetric efficiency as it is, but strive for silence by improved mechanism, and, more important still, by better internal machining. The high efficiency engine is bound to score in the end for many reasons, but principally on account of its lightness, and, perhaps, low petrol consumption, but this type of engine more than any other demands as a first consideration superlative workmanship and perfect design to ensure immunity from the defects of noise and vibration.

Overseas Section.—

Enclosed Chains.

THERE is no doubt that chain cases, like most good things, have their limitations. For the ordinary tourist, who uses his machine for ordinary utility purposes under normal road conditions, the enclosed chain drive is probably the best type of transmission at present in common use, since it is unquestionably the most reliable both as regards freedom from breakdown and the amount of attention required; but, at all events, the cases must be thoroughly well and solidly constructed, otherwise they do not warrant their existence. Shoddily made chain cases fall short of performing their primary function in retaining the lubricant, while they are apt to act merely as mud-imprisoners. We have known instances when solid chunks of tightly packed mud had to be dug out of the bottom of a badly made case after a few weeks of all-weather riding.

A well made chain case,—on the other hand, undoubtedly adds very considerably to the life of the transmission system, and also reduces to a minimum the amount of attention the chains require, and so long as it is not subjected to abnormal road conditions, the extra cost and weight are unquestionably worth while.

It is somewhat of an eye-opener to observe how many of the chain-driven machines now in France—and, indeed, the same applies to the military machine in use in England—have had their chain cases partly or entirely stripped away, some of the machines thus stripped being clearly less than six months old. At all events, the chain cases of a military model seldom last longer than a year, and even after a few months of abuse they become a source of annoyance and irritation to the artificers responsible for them. We refer not to any particular make, as we ourselves have seen practically every make representing British manufacture in this line in the same condition, and it is to be observed that our American Allies, whose experience of bad roads is more general than our own, have eschewed the enclosed chain from the outset and shown favour to the system of providing adequate shields.

It would be of considerable interest and perhaps of no little value to home manufacturers if Overseas riders were to submit their opinions as regards this all-important question of chain transmission. Their ideas on the question might be summarised in a later article, thus permitting a more or less definite conclusion to be arrived at. As regards the rider in settled regions, we have no doubt whatever that efficient chain cases are the goods for him, though we repeat that good workmanship and design are vitally necessary.

TO OVERSEAS READERS.

WHICH TYPE?

IN order to ascertain Overseas opinion, we would invite readers resident in distant countries to fill up the form on page 474. Valuable data will be the result, important to manufacturers and of interest to "THE MOTOR CYCLE." Separate awards will be made for Overseas readers, and the time for closing the referendum extended.

Gas or Electricity?

ACETYLENE lamps are not an unmixed blessing at any time, and for the Overseas rider they are often a curse. In humid climates carbide wastes appallingly, even though the utmost care be taken in storing it, and the aroma of decomposing carbide is not refreshing at any time. Carbide generators in themselves vie with driving chains for genuine filth, and on the whole the present system of acetylene lighting can be regarded as nothing better than a makeshift and a fly in the motor cyclist's ointment.

Do British manufacturers realise that their American competitors are obtaining a huge pull as regards Overseas trade by keeping thoroughly up to the times in electric equipment? The fact that one machine is electrically equipped while another is not goes a very long way in influencing the selection of any Overseas rider who has night riding to do.

A Great Demand.

WE would again dwell upon the necessity for firms, concentrating their energies upon the lighting problem, to do their utmost towards the realisation of a light and compact lighting set for solo mounts. The combined flywheel lighting dynamo and magneto will doubtless make its *début* in due course, and it will come as an immense blessing to motor cyclists in general. Moreover, it will give an impulse to Overseas trade, so far as the solo mount is concerned.

At present, however, we ask for nothing more than the proper development of the light and self-contained dynamo for the solo mount—taking it that the same instrument will be sufficient for most Overseas sidecarists also, since all they require is a good head light and perhaps a small shunt wound side lamp to show the width of the outfit. One or two such outfits of bedrock simplicity are at present in the experimental stage, and we strongly recommend manufacturers who wish to establish good Overseas markets after the war seriously to contemplate one of these instruments as a standard fitment.

A Selection of Letters from Readers scattered all over the World.

The Importance of Price.

"An Officer in India" writes: "An enthusiastic motor cyclist, I keep myself informed of the latest developments by means of your interesting weekly. I view with alarm the rapidly rising prices of motor cycles, which are bound to react detrimentally on the movement.

"The price of a good 5 to 8 h.p. combination, *minus lamps and horn*, now averages about £120. Contrast this with the Ford car, which sells, completely ready for the road, at less than £80 in the States! The Ford has proved its reliability all over the world, and the only points in favour of the sidecar combination are running expenses, storage, and taxation.

"I see that the Overland Co.—whose productions have a deservedly good reputation—intend to put on the market a 'Baby' model that will sell *complete* for about £100 in England. Obviously thousands of purchasers will prefer the comfort of such a cheap and reliable car to the relative discomfort of the more expensive English combination.

"It is futile to talk of capturing Overseas trade when British manufacturers persist in demanding such ridiculous prices for their articles. Certainly out here discriminating purchasers prefer the cheap, powerful, and yet reliable American car every time.

"Experienced motor engineers tell me that there is no reason why a good high-powered combination should not be

Overseas Section.—

sold completely ready for the road for £75 and a solo for £60. Obviously with motor cycles at their present prices somebody must be making extraordinary profits.

"Apparently our motor cycle manufacturers require to study the business methods of American car manufacturers, instead of which they seem to be deliberately playing into their hands."

Post-war Trade and the Huns.

Mr. E. A. Ager, of Victoria, Australia, writes as follows: "As a constant reader of your fine paper for a great number of years, I wish to congratulate you on your attitude in regard to German goods during and after the war. I feel sure that you have the best wishes of the people of this country in your endeavours to oust the Hun from the British market. It has come as a great surprise to me to see that some faint-hearted people of perhaps a very doubtful patriotism have taken exception to your firm attitude. Perhaps they have money invested in the land of the living devil, and are afraid of losing it entirely if we as a nation refuse to deal with Huns.

"I am an Australian by birth, but my forefathers on both sides of the family have been Army and Navy men, and perhaps owing to this fact the spirit is stronger in me than in others.

"I have been in the cycle and motor cycle and car trade since 1897, and think I am qualified to speak with a certain amount of knowledge. I would like to ask these croakers a few pertinent questions, as they seem to think that Hun goods are superior. Now, to take a few of the many things in the cycle and motor line.

"Have they come across any Hun chains like a Coventry or Renold? I have not. A cycle or motor cycle saddle like a Brooks? Can any Riemanns lamp come up to a Lucas, F.R.S., P. and H., or Miller, or other equally good English lamp? I assert no!

"Have the Huns produced a motor cycle to equal machines like a Triumph, Douglas, Matchless, P. and M., and dozens of others too numerous to mention? I have never seen nor heard of any. I have never found their tyres up to British. Even take a push bicycle. Can they turn out a set of component fittings like the B.S.A.? No, never! I can say that I have personally built thousands of pedal cycles and have never come across a decent set of German fittings. Can they turn out a decent complete cycle like Humber, Raleigh, Swift, etc.? I have not yet heard of one. They cannot even turn out *men* like ours. Then take magnetos. The Bosch was a sheer piece of bluff which our honest John Bull natures swallowed; but no more if we stick together and fight the German in trade as sternly as we have done in this terrible war.

"Now my advice to everyone with a spark of patriotism is to do as I have done ever since I have been in a business of my own. I determined to stock and sell nothing but the best, and that is British. I can safely and honestly say that I have not had £5 worth of Hun goods in my stock during the ten years I have been in business, with an average turnover of £4,000.

"I say do not give the Germans a chance to get a leg in, and do not give any of our weak-backed people a chance of dealing with them. Shut them out altogether."

A Good American.

Geo. W. Mathieson, Cape Town, writes: "With reference to 'M.S.'s' little article on the above-mentioned subject replying to mine, under the heading of English *v.* American machines, it perhaps would be just as well to point out that I am writing from South Africa—a place where a machine is really put to the test.

"The American machines may do quite well on English roads, but try them on the bad and see how they last. I am not out to argue that they are not comfortable or that they are not speedy.

"I have owned one of the best known makes, and have enjoyed the comfort, but the reliability was sadly lacking.

"When it did go nothing passed me on the road, but I was ever afraid to try any long tours with it, perhaps the one reason being that we do not meet a garage here every few miles. Now I have just completed a little tour of 220 miles, and the nearest garage at any time was forty-two miles, but luck was with me, as I had no stoppages, and was riding an English outfit.

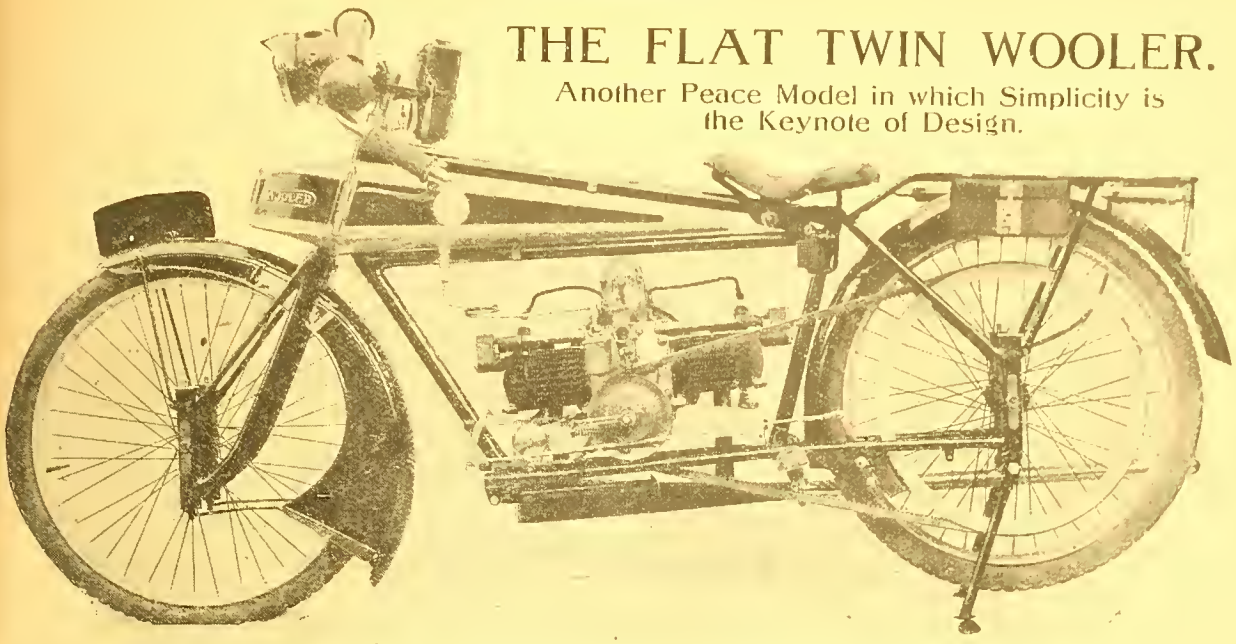
"I have been riding English machines continuously for just over three and a half years, two and a half being on Active Service, and I cannot say enough for the stamp of them. Here is an instance of one machine's life, and it was a 1913 model. It started a military career in 1914, and went through the Rebellion in this country. Towards the latter part of 1914 it went up to South-West Africa, and after touring round on despatch work finished up with the ending of the campaign about the middle of 1915. This machine then proceeded straight up to East Africa, and was still going strong in the middle of 1917, when last I saw it.

"One more question I should like to ask, and that is, how many American machines of 1913 are still seen running about compared with the English machine? So far as I am concerned I have not seen or heard of a single one; but not only do I own a 1913 but know of quite a few English 'buses like my own still going strong. Cheerio!"

A cutting between Durban and Maritzburg, a picturesque district frequented by Durban motor cyclists

THE FLAT TWIN WOOLER.

Another Peace Model in which Simplicity is the Keynote of Design.

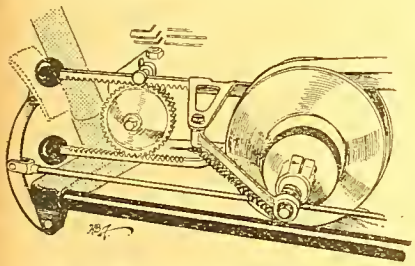


Carburetter side of the new pattern 2¾ h.p. Wooler. The engine is 60 × 60 mm.=340 c.c.

FULL of novel and ingenious ideas, the new 2¾ h.p. flat twin Wooler promises to be an attractive model for the solo rider. It is a remarkably neat design, and the point of accessibility has been fully considered by its designer.

Though the frame is very similar to the two-stroke Wooler, which has several times been described in these pages, the engine is a complete novelty.

It is carried in the frame on two transverse lugs and secured by means of two bolts in such a manner that it may be removed bodily without the slightest difficulty—in fact, Mr Wooler has succeeded in allowing any part of the engine to be dismantled solely with the aid of an ordinary set-spanner.

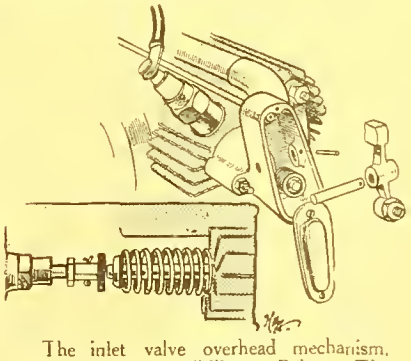


The racks and pinion adjustment of the belt.

The cylinders, which have detachable heads, are held by two longitudinal bolts, provided with eyes at one end, through which pass the crank case bolts, while the heads, which are provided with ground joints, have no copper asbestos washers, and are clamped on to the cylinders by means of clamp plates, which are held by nuts on the bolts.

The bore and stroke are 60 mm. × 60 mm. respectively. Overhead inlet valves are fitted, the rockers being entirely enclosed. On the end of the rocker arm is an adjustable screw, by means of which the tappet rod adjustment can be effected. All the working valve parts, which are adequately protected from dust, are lubricated by oil passing up the hollow tappet rods. The method of adjusting the exhaust valve tappets is also worth mentioning. The end of the tappet is screwed, and has a saw-cut down the centre, while over the threaded portion a cap or head in which there are holes, is screwed. To adjust the tappets a split pin, passing through one of the holes and the saw-cut, is removed, and if the pin is inserted in the next hole an adjustment of $\frac{1}{10}$ mm. is provided.

60 × 60 mm. engine.
Overhead inlet valves.
Detachable heads.
Mechanical lubrication.
All-belt drive.
Variable gear.
Sprung wheels.

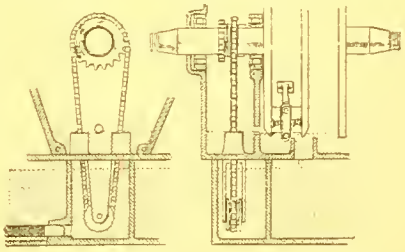


The inlet valve overhead mechanism, showing its accessibility. Below: The exhaust valve tappet adjustment.

A streamline silencer is fitted, as will be noticed in the illustration; in fact, in the general design it will be apparent that the idea of streamlining has been by no means neglected.

The crankshaft runs on two roller bearings on the flywheel side, and on a single roller bearing on the pulley side.

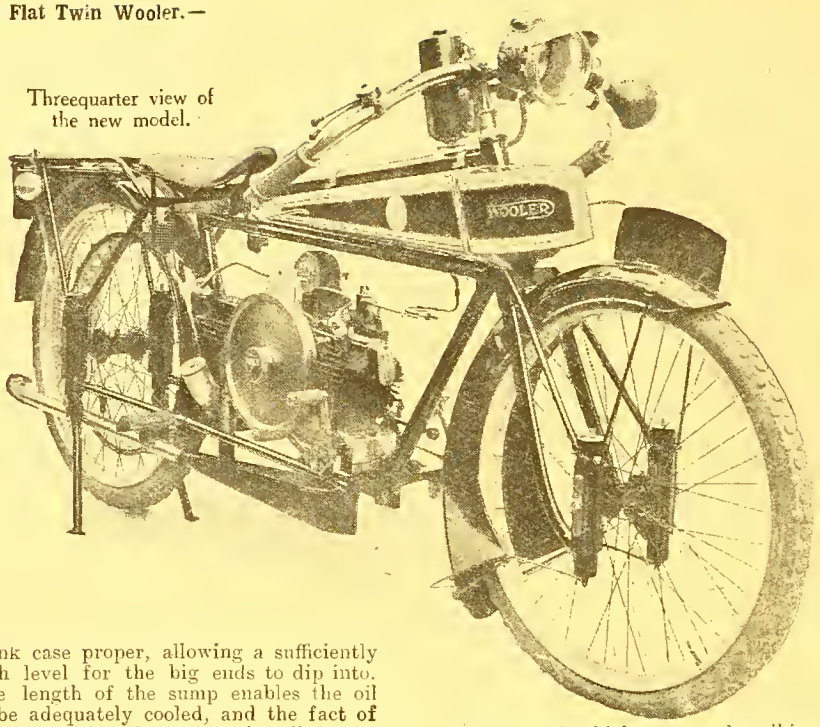
The carburetter is fastened on to a duet which is extended into the crank case, where it is met by two copper inlet pipes which are provided with airtight glands. The other ends of the inlet pipes are threaded and screwed into the cylinders. It is unnecessary to disturb these joints in dismantling the inlet valve cages, the removal of the latter being accomplished by undoing two nuts, which enables the pipe and cage to be removed together.



The Wooler lubrication system. On the extreme left will be seen the oil filter.

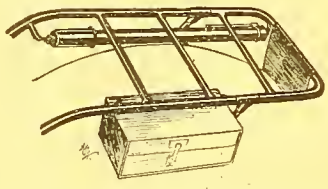
Beneath the crank case is a large sump, in which rather over a quart of oil is carried. At the side of the sump, underneath the timing gear box, is a small pocket, and the only connection between this pocket and the rest of the sump is through a long gauze tube, so that all oil reaching the pocket is adequately filtered. An 8 mm. chain, driven off a sprocket on the timing shaft, rotates about a roller at the base of the pocket, and delivers oil to the timing gear case, whence it overflows into the

The Flat Twin Wooler.—



Threequarter view of the new model.

crank case proper, allowing a sufficiently high level for the big ends to dip into. The length of the sump enables the oil to be adequately cooled, and the fact of the big ends dipping in the oil in the sump lubricates the rest of the moving parts by splash.



The carrier of the new Wooler.

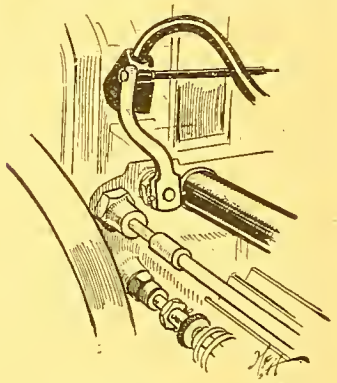
So far as the gear is concerned, this is very much the same as on the two-stroke, being of the expanding pulley pattern, the pulley being under-geared, and being so arranged that as it is expanded it is swung forward, thus keeping the same belt tension throughout.

In the model which we are describing, the pedal on the off side of the machine works on a ratchet, and rotates a pinion revolving between two parallel racks. These are connected to the pulley, so that depressing the pedal not only swings the pulley forward, but also expands it for the purpose of lowering the gear. By undoing a bolt which runs through a short shaft attached to the gear, and held in position by a spring, the upper of the two racks may be lifted, and this allows the belt to be tightened by sliding the gear forward. As soon as the correct tension is found, the rack is again dropped and the bolt replaced. This enables the pinion to engage in another position on the two racks. The foot brake is of an ingenious design, and has a compensating action.

The petrol tank is very much of the same pattern as that in the previous model, but the front portion is now an auxiliary tank, which is detachable, and carries enough petrol for about twenty miles.

To return to the frame, this is built up entirely of straight tubes, and is provided with the same system of springing as in the two-stroke model, which consists of supporting the wheel spindles between two coil springs working in tubes brazed on to the fork end, but is 5in. shorter, and has a secondary tube below the main dropped top tube. The mudguards are wide and intensely strong, and all nuts attaching them to the frame are outside, so that they can be tightened with a set-spanner. Naturally, nuts carried inside the mudguards soon rust up, and if any work loose they are exceedingly difficult to tighten. The foot brake is of ingenious design, and has a compensating action.

Altogether, the design strikes us as most promising, and we look forward with pleasure to an early trial on the road. In a few months' time the Wooler Engineering Co. (Old Oak Common Lane, Willesden Junction, London, N.W.10) will move to larger premises, where vastly better manufacturing facilities will be afforded. We congratulate the company in introducing their new model so promptly. The two-stroke Wooler will also be retained, but the engine is being altered slightly to suit the new frame.



The exhaust lifter crank.

A RUN ON THE POST-WAR CLYNO.

Impressions on the Road of the New 8 h.p. Model.

WHILE we are not yet permitted to give details of the new model Clyno, it will interest potential buyers to know that after a run on it we are very favourably impressed. Without doubt the new Clyno 8 h.p. engine is a great advance on pre-war standards of silence and flexibility. Without inferring that American twins have been superior to their English contemporaries, there are certain characteristics about the former which have been largely responsible for their popularity in this country. These points are silence and smoothness of running due to the employment of low compression engines. Our first impressions of the Clyno were those same points; but, in this case, the results are obtained without sacrifice of power efficiency. Thus, the admirer of the U.S. product will find an English make embodying at least two of the features they attribute to the American machine exclusively.

With Mr. Archie Cocks at the helm, we were given a trial run on a test machine which has covered many thousands of miles since it was handed over to Messrs. Hugh Gibson and Archie Cocks to be tested to destruction. The mileage to the credit of the machine is equal to quite three seasons' running of the average motor cyclist, and there is now no part, of the engine at least, of which there can be any doubt.

We left the greatly extended Clyno works, and the top gear was engaged immediately. We turned up a steep hill, upon which Mr. Cocks demonstrated the power and flexibility of the engine at various speeds and the efficiency of the shock absorber. Although the clutch on this particular machine was considered unduly "harsh"—that is to say, when it was engaged there was no slip—we were reminded of old favourite machines with big engines and all-belt drive, so silky was the running. Mr. Cocks accelerated and decelerated on the hill, but at no time was any snatch experienced; in fact, the "sensation" would be difficult to improve, even if a four-cylinder engine were used.

Altogether the new Clyno strikes us as being one of *the* models of the immediate future. Its general appearance is extremely good, but of this and other things we shall have more to say in a later issue.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

THOSE LITTLE WORRIES.

Sir,—Something happened to the penultimate (good word!) paragraph of my letter in your issue of the 14th inst. The first sentence of it should have read: "But the saddle tank gets over both these points, and the triangulated top frame is being clearly recognised as the consummation of the inclined top tube idea." I do not know how the words "the triangulated top frame" came to be omitted.

DOUGLAS LEECHMAN.

A CURIOUS CASE.

Sir,—In your issue of May 16th a correspondent writes to tell you of a case where a motor cycle fired regularly minus a carbon brush in the magneto.

I should like to mention that my B.S.A. carried me out here minus a carbon brush for thirty-five miles with only occasional misfires when the bicycle had a "struggle" up rough and steep hills. Otherwise there was no perceptible difference in the running. S. C. DU ROSE (Cpl.).

East Africa.

MICA SPARKING PLUGS.

Sir,—May I draw your attention to a trifling misstatement in your article on K.L.G. sparking plugs on page 410 of the issue dated the 7th inst.? In the last paragraph you remark that the weak point of mica plugs lies in the failure of the adhesive between the layers of mica. As a matter of fact, no adhesive is used or is necessary in the manufacture of this type of plug—the mica washers being threaded on the spindle in a dry state, compressed by the nut on the electrode, and then turned to shape.

R. F. MAYNE.

DETACHABLE HEADS.

Sir,—"Non-detachable" has evidently met the *bête noire* of removable combustion heads. A great deal can be said both for and against this design. But to answer his question as to the success of detachable heads, the answer is in the affirmative.

To ensure a perfect joint both cylinder and head surfaces must be perfectly clean and bright, and no harm can be done by grinding them in. The gasket can then be inserted and the head replaced, care being taken to tighten the cylinder head nuts in the orthodox manner.

Engines are extant at the present day that have no gaskets or washers, but depend on two flat surfaces being dead true; and they do and must not leak!

I have accomplished this in a Hedstrom Indian motor, which was not intended or constructed for use without a packing medium.

On the other hand, your correspondent's motor may have suffered distortion owing to a bad spill.

J. P. J. CHAPMAN.

BRITISH AND AMERICAN SIDECAR MODELS.

Sir,—Just as a reminder to Mr. Fairbrother, who writes in such glowing praise of one particular make of English machine in your issue of the 21st inst.

May I be permitted to point out to him that at least a few points which are looked upon and boomed as post-war improvements" have for years been used on first-class American machines; for instance, amongst other things, 28 × 3in. wheels and tyres, spring frames, etc.

I will not again enter into the argument from a detail point, but may I ask Mr. Fairbrother if he does not think it is the time to go a bit further and take a few more points; also does he not think we could well do without so much malleable iron, used to a great extent on many of the best British machines; also would we suffer much if the absolutely ridiculous front rim brake were buried with the war? Then, when we get good automatic carburetters and reliable lighting sets we may start and consider we are at last getting in line.

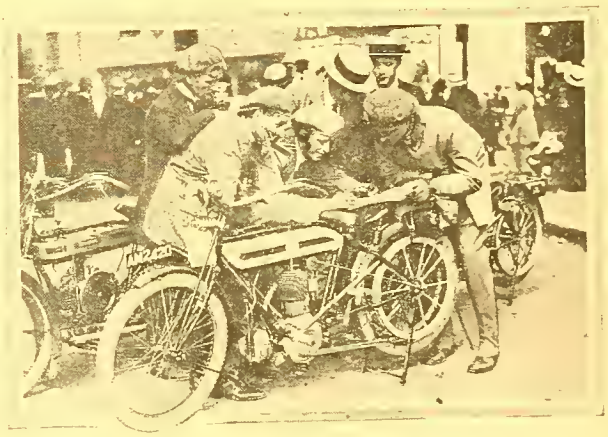
I am not in any way trying to belittle either your correspondent or the machine he mentions, but he ought to try and see *both* sides just a bit. Perhaps he has not had a very wide experience with a first-class American machine which would put him in a position to be just and make at least something resembling a fair comparison.

In concluding, may I congratulate you on your Special Issue and the way you have carried on during the last dark four years of nightmare. But we now see brighter days coming, with promise of the show, the track, six days, and the good old island. BERT HOULDING.

THREE-WHEELERS.

Sir,—I read "Ixion's" letter (as I always do) with much enjoyment. I do not at all mind his criticism of my arguments, which do not matter, and I appreciate his assent to my conclusions, which do. After all, we seem to differ mainly on one point—the behaviour of the three-wheeler on rough and greasy roads. Now I did not say that the three-wheel track and single driver were an advantage under such conditions, but, on the contrary, that they were among "the disadvantages attributed to the three-wheeler." At the same time, I pointed out that, as a matter of fact, a certain three-wheeler had made good on the roughest and greasiest roads in England in a number of public trials. "Ixion" is good enough to endorse this, but he proceeds to jump on me, and says that this is owing to the fact that "the Morgan has 8 h.p. at its disposal and its weight is low." I daresay that he is right. But, after all, the Morgan is light, *because it is a three-wheeler*. Therefore the three-wheeler, *qua* three-wheeler, does make good on rough and greasy roads. Q.E.D.

Stoke Lacy. H. GEORGE MORGAN.



During the critical period in August, 1914, hundreds of motor cyclists stepped in to help to stem the German tide. The photograph shows a group filling up recruiting forms.

CARBURETTER DESIGN.

Sir,—In your issue of August 15th you illustrated a carburetter of our design. We are now making arrangements for the manufacture of this instrument, and one of our first difficulties is the matter of connection from the carburetter to the inlet pipe. You will probably remember that in the model you illustrated an ordinary flange is shown. The usual practice, of course, is to have a clip-on connection, and we are wondering what the views of your readers are upon this question.

It seems to us as carburetter designers, and therefore primarily concerned with the matter of good carburation, that it is impossible to expect an absolutely airtight connection with a clip-on device such as is standard in motor cycle carburetters at present. Further, we cannot see the necessity for a quickly detachable connection of this type, because all the accessories of the carburetter, such as the jets, choke tube, needles, etc., are quickly detachable without the removal of the main body. Supposing that the outlet of the carburetter is made to limit gauge, this is very seldom the case with the stub of the inlet pipe. Therefore there is always a leak, very small probably, at this point. We think this is amply borne out by the very common use of insulating tape at this connection. We are of the opinion that ultimately a flange fitting will be standard for this connection, and we think that this might very probably be one of the minor post-war improvements in motor cycle design.

G. R. JONES.
W. D. MARCHANT.

[The flange doubtless gives a more airtight joint than the usual clip.—ED.]

AN IMPERIAL MEMORIAL SCHEME.

Sir,—The Veterans' Association venture to ask not only the courtesy of your columns, but also your cordial co-operation in bringing more prominently before the public a scheme for the promotion of which the Association was formed. By means of this scheme, the Empire will prove itself not unmindful of its duty by brightening and in a large measure securing the future of those who in fighting for us have handicapped themselves in the battle of life.

Above all things, the danger of overlapping must be avoided, and it is sufficient to say that the work of the Veterans' Association in no way conflicts with that of any other institution, that it assists all, and that it has as its nucleus the Veterans' Club, which prior to the war filled a felt want, and which during the last four years has given most adequate proof of the wisdom and foresight of its founders.

The Veterans' Association is becoming gradually recognised as the central organisation of the Veterans of the Empire, but in order to meet the far-reaching needs of the future its scope must be widely extended. Accordingly under the title of "An Imperial Memorial," this comprehensive scheme of a sound Imperial character has been brought into being, and by its means mental and bodily comforts will be conferred upon such of the ex-service men of the Empire as need a helping hand. Through it there will be provided a Veterans' Headquarters and a "clearing house," and facilities for obtaining every kind of information, advice, and assistance. Especially will it afford the means of rebuilding and maintaining the health of those who should still be as capable of adding to the strength of the Empire in peace as they were of safeguarding it in war.

This Imperial Memorial will embody in itself the duty which we owe to those who have stood between us and disaster. It is not intended to be a mere epitaph, but a practical plan promoted for the benefit and relief of those who have given so much for us, and always with the further intention of making them fit to carry on their duties as citizens. To those it helps it will be a token of our gratitude—an institution in which they themselves can take a personal pride. A small tribute indeed! But surely more practical than brasses or memorial stones. It will be a permanent and visible recognition of their own efforts and of their comrades' sacrifices, and when endowed and established on an appropriate scale it will serve as an inspiration to the patriotism of future generations.

To carry out the project on adequate preliminary lines, a sum of at least £1,000,000 will be required for purchasing a site, erecting, and endowing the necessary buildings for an enlarged Veterans' Club, with at least 1,000 bedrooms and its own extended organisations, with special reference to representation of the Dominions and Colonies, the United States of America, and Allies generally who have participated so gloriously in the war. This amount will also enable the Association to encourage the formation of kindred undertakings in other great cities of the Empire, and as part of the whole scheme to provide for the purchase and upkeep of a first convalescent home for men of His Majesty's Forces who have been discharged to civil life, many of whom will from time to time, unhappily, require treatment. From our personal experience, we confidently assert that such a convalescent home will help to fill one of the most urgent needs of the day. These discharged men cannot afford to pay medical fees, nor do they possess facilities for treatment in their own homes.

It is therefore essential that they should be given the opportunity of the benefits of an institution of their own, and that they should not run the risk of being relegated to infirmaries, and we are glad to announce that the Veterans' Association has now at its disposal a definite means of providing for this necessity, as it has secured the option of the purchase of a property in Epping Forest capable of accommodating at least six hundred patients, and in all ways admirably suited as a convalescent home.

The Association appeals to all for help to establish this Memorial, which extends to the whole Empire, and in particular it appeals :

1. To those who have been debarred from directly assisting by fighting for the Empire, and who now have an opportunity of helping to rebuild it in a way which will be a lasting tribute to the heroes who have fallen, and to our sailors, soldiers, and airmen, who, offering themselves unstintingly, have survived the risk, and whose future must under no circumstances become a reproach to us.

2. To those who have lost some relatives and friends, and who would gladly see some permanent, practical memorial erected to their memory.

Donations, large or small, should be forwarded to the Treasurers or the Secretary, Veterans' Association, 47, Bedford Row, W.C.1. Any donations can, if desired, be specially devoted to the Convalescent Home, in which case they should be marked "Convalescent Home."

AGA KHAN.
DAVID BEATTY.
LIONEL E. O. CHARLTON, Brig.-Gen. R.A.F.
R. H. COX.
CLAUDE CHAMPION DE CRESPIGNY.
H. BARGRAVE DEANE.
ARTHUR CONAN DOYLE.
DENBIGH, Col.-Commdg. H.A.C.
E. R. FREMANTLE.
LIONEL HALSEY.
J. H. HERTZ, Chief Rabbi.
ARTHUR R. HOLBROOK, Col.
W. VANSITTART HOWARD.
LOUIS JACKSON, Maj.-Gen.
ROGER KEYES.
RONALD B. LANE, Maj.-Gen.
A. F. LONDON.
CHARLES F. SEBAG MONTEFIORE.
ARTHUR PEARSON.
A. T. SLOGGETT, Lt.-Gen.
WILLIAM R. SMITH, Col. M.D.
MARK SYKES.
H. L. TOMKINS, Lt.-Col., Indian Army.
ALFRED E. TURNER, Maj.-Gen.
BERNARD VAUGHAN.
H. F. WILSON.

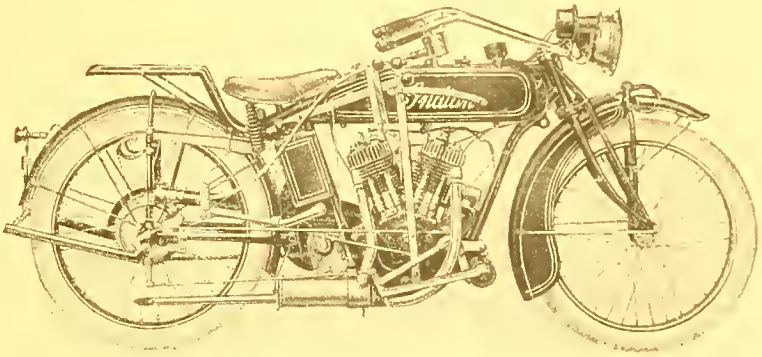
BOOKS FOR MOTOR CYCLISTS

HINTS AND TIPS FOR MOTOR CYCLISTS.
A valuable collection of useful "wrinkles" and items of information concerning the running, management, and repair of motor cycles.
Price 2/- net. By post, 2/3.

TRACING TROUBLES.
Motor Cycle Faults, Their Identification, and Their Remedies Fully Explained. **Price 2/- net. By post, 2/2.**

Obtainable by post (remittance with order) from
ILIFFE & SONS Ltd., 20, Tudor Street, London, E.C.4
or of leading Booksellers and Railway Bookstalls.

We regret that we are not in a position to supply motor cycles at the present time. But we can send a 1918 descriptive list on application. *This applies to Great Britain only.*



HENDEE MANUFACTURING Co.,
"Indian House," 366-368, Euston Rd., London, N.W.
Telephone: Museum 1648.
Telegrams: "Hendian, Euston, London."
AUSTRALIA—109-113, Russell St., Melbourne.
CANADIAN WORKS—12-14, Mercer St., Toronto.
AFRICA—Indian House, 127-9, Commissioner St., Johannesburg; Indian House, 579, West St., Durban; Indian House, Straud St., Port Elizabeth.

1918 Indian Powerplus

Electrically Equipped.

The time has come, the Walrus said,
To talk of many things:
Of Shows—of brand new motor bikes
which Peace, triumphant, brings —
And when the dear old Petrol Board
Intends to spread its wings.

All in good time AND VERY SOON NOW.
What is Godfrey's Programme?
As in the past, Motorists can absolutely rely on

THE BEST MACHINES
THE BEST TREATMENT
THE BEST SERVICE

As regards new stock, we have already a good show and have arranged for the earliest possible deliveries of all the best models. We have started a Waiting List, and shall be glad to receive your commands.

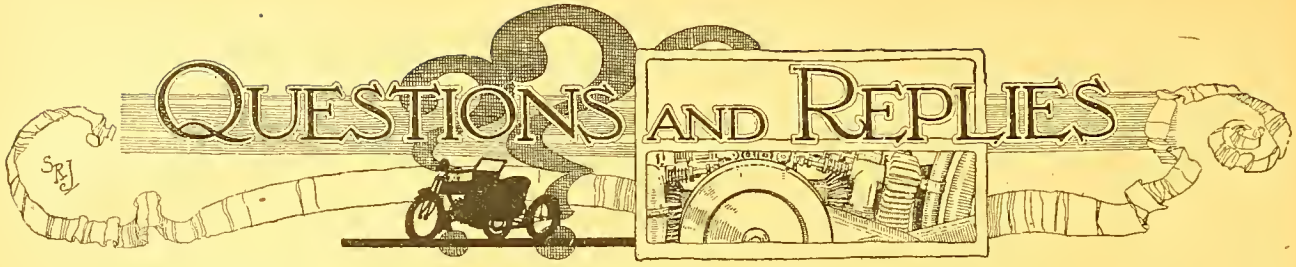
As regards second-hand machines, we have been consistent all through the bad times and do not intend to alter our methods now. WE DO KNOW the state of every machine inside and out. We make it our business to know by dismantling and thoroughly overhauling every machine before resale.

This is why Godfrey's have so good a name amongst motor cyclists the World over, and why you can deal with them with every confidence.

May we send you our list?

EXCHANGES
EASY TERMS
Telephone—7091 Mayfair (2 lines).

GODFREY'S, Ltd., 208, Great Portland St., London, W.1.



A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

A Chemical Query.

Please tell me (1) if benzole is a mixture of two compounds; (2) and if so, what are the formulæ for these two compounds; (3) also, what is the formula for pre-war Shell No. 1 petrol, not present-day "war spirit"?—W.W.D.

Benzole (90% the usual motor fuel) is a mixture of about three of benzene (C_6H_6) to one of toluene ($C_6H_5 - CH_3$). Pre-war Shell was composed principally of hexane (C_6H_{14}), but might contain a little pentane (C_5H_{12}) and heptane (C_7H_{16}), all three being distillates of petroleum.

Loss of Power.

My machine is a 2¾ h.p. 1915 lightweight. Recently I have had much trouble with it. It would run well for some distance and then there would be a sudden falling off in power. Later it would pick up and travel well again. Added to this the engine overheated fearfully and consistently failed on hills. All this pointed to carburetter trouble, yet the (size 24 jet) carburetter, although taken down many times, was always found clean. The engine was also taken down and cleaned. A piston ring which was found broken was replaced. The inlet valve also had not had sufficient clearance, and this was remedied. All joints were repacked. After all this, although it pulls better, I still get the same jibbing. I have put a 29 jet in as well. The machine now runs well for perhaps half a mile, then the power falls off, and it slows down for a hundred yards or so without any alteration of the throttle, then, without any warning, it will suddenly accelerate and shoot off at its original speed. Before I made any alterations the engine petered out altogether and stopped; now it never actually stops, but gradually runs very slowly, and then just as one is expecting it to give out it accelerates automatically. Whilst the engine is working properly there is the usual crisp crackle of the explosions, but the slowing down is always accompanied by the vanishing of this crackle, and the explosions sound muffled.—W.W.

It is just possible that one of the valves may be sticking in its guide, which would account for the temporary loss of power, or the same symptoms could be derived from a defective magneto. It is also possible that by changing the plug you may cure the trouble, as it may be due to pre-ignition

Stove Enamelling.

I should be much obliged if you could give me information as to methods employed in enamelling by the stoving process. I have every facility for fitting up the necessary gear, and do not mind the trouble and expense incurred. I have a Zenith motor cycle. The back tyre is rather an easy fit, and appears to move round the rim. Will fitting security bolts cure this trouble, and is there any disadvantage in fitting them except the little extra trouble when repairing punctures?—W.S.G.

For stove enamelling, the parts are first thoroughly cleaned, and then are treated with enamel. They should afterwards be hung up in an oven and submitted to the following temperatures, which depend upon the colour of the enamel used: if grey, the temperature should be 140°; if black is used 300°. The time required is from four to six hours. Security bolts will stop the tyre from creeping. There is no disadvantage whatever in fitting them.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

Twin Connecting Rods.

When assembling a V twin engine, is there any recognised or "standing" arrangement for the connecting rods—in other words, to which cylinder, back or front, does the fork-ended rod go, and to which the one with single bearing? Would changing them over after a considerable amount of running do any good, or harm, in the way of removing that slackness in the gudgeon pin bearing, due to the rocking motion wearing an oval? Of course, such would only mean a temporary remedy.—H.A.S.

We do not think there is any recognised practice that we can quote as guidance for you in your difficulty, and such a point would necessarily depend largely on the make of the engine. If the two connecting rods are of exactly similar length, which they need not be necessarily, it is most probable it is immaterial which connecting rod is placed in the front cylinder. We do not think any striking benefit or harm would follow from changing over the connecting rods if they are exactly the same length.

EXPERIENCES WANTED.

"E.G.W." (Bristol).—Can any reader give information with regard to the fitting of a different make of cylinder to a Premier motor cycle, such as the B.S.A.?

"Con" (Ardgay).—4½ h.p. James. General reliability as a sidecar machine.

READER'S REPLY.

Brazing Cast Iron.

In your Queries and Replies of October 10th, under "Trade Queries" (No. 5), "H.E.H." asks, "How can I copper cast iron for brazing?" It may interest him to know that there is a firm at Stratford, E., which is known as the Cast Iron Brazing Co. ("Cast Knit"). This firm, I believe, has had great experience in the art of brazing cast iron. A personal friend of mine has had several jobs executed by it, and has been well satisfied with the results.—E. C. Bain.

RECOMMENDED ROUTES.

Newcastle to Huntly, N.B.—G.H.S.

Newcastle, Morpeth, Wooler, Coldstream, Greenlaw, Park Head, Dalkeith, Edinburgh, Grantown, by ferry to Burntisland, Perth, Cupar Angus, Forfar, Brechin, Fettercairn, Banchory, Lumphanan, Bridge of Alford Hotel, straight on to Huntly. From Brechin the road is likely to be hilly, but the scenery is fine. If you have any doubt about the hill-climbing powers of your machine you had better go through Stonehaven, Aberdeen, and Inverurie. Approximately 270 miles.

Thornton Heath to Fawley (*via* Botley and Chandlers Ford).—W.J.H.

Thornton Heath, Croydon, Sutton, Epsom, Leatherhead, Guildford, Hog's Back, Farnham, Alton, East Tisted, West Meon, Meonstoke, Bishop's Waltham, Botley, Fair Oak, Eastleigh, Chandlers Ford. From there make your way towards Southampton until you reach Bassett, where turn right near a pond for Shirley, and go through this place to Totton; then go through Eling and Marchwood to Fawley. The distance is approximately 105 miles.

3 DAYS' FREE TRIAL!
WEEKS' OPTION OF EXCHANGE!
MONTHS' GUARANTEE!

We feel that we shall not be accused of beating the big drum about ourselves, or of unduly patting ourselves on the back, when we state that you will have a long way to go before you can obtain such terms of dealing as those briefly capitulated above. We are out for business—we are out for large business; but, more than that, we are out for **straight** business.

A large number of our clients reside in the Country, and to these especially the above terms will appeal. For their benefit, and the benefit of others, we will explain our terms more fully.

(A.) **THREE DAYS' FREE TRIAL.**—With any machine sold, should it not give complete satisfaction, we will give you your money back in full, without question, within three days of purchase, and, in the case of Country customers, within three days of their receiving the machine.

(B.) **THREE WEEKS' OPTION OF EXCHANGE.**—With any machine sold we offer to exchange free of charge within three weeks of purchase, for anything else from stock. This gives an uncertain customer the opportunity of trying and comparing different makes and types at our expense.

(C.) **THREE MONTHS' GUARANTEE.**—We unreservedly guarantee all our machines value £25 and over—and many under £25 are also guaranteed. Our Guarantee is the same as the makers give when the machine is new. Could any guarantee be better?

Remember the three terms of our dealing, and ask yourself whether you could obtain equal or better terms elsewhere.

We would state, in conclusion, that we have—many months ago—placed large contracts with the makers for nearly all NEW MOTOR CYCLES, and shall be amongst the earliest to give delivery. Our waiting list for new machines is now open, and grows apace. Do not be left out, but let us have your requirements, and quote you a delivery date.

(A) New Machines (without Permit).

BRITISH EXCELSIOR, 2¾ h.p. J.A.P., 2-speed, clutch..... £48 10
CALTHORPE-J.A.P., 2¾ h.p., 2-speed, and clutch £47 0
CALTHORPE-J.A.P. 4-5 h.p. twin Combination £81 6
JAMES 4¼ h.p. 3-speed Combination £99 0
JAMES 5-6 h.p. twin Combination, 28in. wheels £104 0
RUDGE-MULTI, 3½ h.p., standard, clutch, kick-start £65 0
Also delivery in a few weeks of **B.S.A., ALLON,** War Model **MATCHLESS** Combination, and others, without permits.

(B) Second-hand Guaranteed Machines (without Permit).

A.J.S., 2¾ h.p., 2-speed clutch, and kick-start, as new ..... 55 gns.
ABINGDON KING DICK, 4¼ h.p., special competition machine, 3-speed, sporting Sidecar, wide tank ..... 55 gns.
CALTHORPE-J.A.P., 1916, 2-speed, clutch ..... 32 gns.
CALTHORPE-J.A.P., 1915, 2-speed, clutch ..... 29 gns.
CALTHORPE-J.A.P., 1915, 2-speed, clutch ..... 26 gns.
CARDEN MONOCAR, 1915, de luxe, 6 h.p., repainted ..... 55 gns.
CONNAUGHT, 1916, single-speed, 2-stroke ..... 21 gns.
CHASE-J.A.P., 1915, 6 h.p., T.T., Jardine 2-speed ..... 45 gns.
DOUGLAS, 1914, 2¾ h.p., 2-speed, T.T. ..... 34 gns.
ENFIELD, 1916, 3 h.p., 2-speed, clutch, kick-start ..... 42 gns.
F.N., 1914, 7-9 h.p., 3-speed, 4-cylinder, coach Sidecar ..... 68 gns.
F.N., 1913 5-6 h.p., 2-speed, 4-cylinder, clutch ..... 28 gns.
HUMBER, 1918, 3½ h.p., 3-speed, flat twin, as new ..... 68 gns.
HUMBER 1918 6-8 h.p. flat twin 3-speed water-cooled Combination ..... 89 gns.
HUMBER 1918 6-8 h.p. flat twin 3-speed water-cooled Combination, spare wheel ..... 93 gns.
INDIAN, 1916, 8 h.p., Powerplus, 3-speed, as new ..... 72 gns.
JAMES, 1916, 3½ h.p., twin, T.T., 3-speed ..... 49 gns.
JAMES, 1914, 4½ h.p., single-cylinder, re-enamelled ..... 29 gns.
LEVIS, 1916, Popular ..... 22 gns.
MOTOSACOCHE, 1917, 3½ h.p., twin, Enfield gears, clutch, kick-start, coach Sidecar, as new ..... 59 gns.
MATCHLESS 1917 M.A.G. Combination, Lucas dynamo lighting outfit, fully equipped ..... 130 gns.
MORGAN, 1914, Grand Prix, water-cooled J.A.P. ..... 100 gns.
MORGAN, 1914, air-cooled J.A.P., hood, screen ..... 75 gns.
NEW IMPERIAL, 1916, 2-speed, re-enamelled ..... 32 gns.
N.S.U., 1914, 3 h.p., T.T., actual T.T. mount ..... 28 gns.
PREMIER, 1914, 3½ h.p., 2-speed countershaft ..... 29 gns.
QUADRANT, 1913, 4 h.p., 3-speed, re-enamelled ..... 31 gns.
RUDGE-MULTI, I.O.M., T.T., 1916, sloping tank ..... 58 gns.
RUDGE-MULTI, I.O.M., T.T., 1917, disc wheels, long plated exhaust, as new ..... 65 gns.
RUDGE-MULTI, 1915, T.T., 3½ h.p., wide tank ..... 39 gns.
RUDGE-MULTI, 1914, 3½ h.p., standard ..... 32 gns.
RUDGE-MULTI, 1913, 3½ h.p., standard ..... 28 gns.
SUNBEAM, 1916, T.T., 3½ h.p., disc wheels ..... 72 gns.
SUNBEAM, 1916, T.T., 3½ h.p., sporting Sidecar ..... 88 gns.
SUNBEAM, 1915, 6-8 h.p., Gloria Sidecar, perfect ..... 88 gns.
SUNBEAM, 1915, 6-8 h.p., Millford Corvette Sidecar, hood, luggage grid ..... 89 gns.
ROYAL RUBY, 1916, 2-speed, 2-stroke ..... 27 gns.
JUNO-VILLIERS, 1916, 2-speed, 2-stroke ..... 26 gns.
OMEGA, 1916, 2-speed, 2-stroke ..... 27 gns.
SUN-VILLIERS, 1916, single-speed, 2-stroke ..... 21 gns.
TRIUMPH 1913 3-speed Combination ..... 35 gns.
TRIUMPH, 1913, T.T., clutch ..... 26 gns.
ZENITH-GRADUA, 1914, 3½ h.p., re-enamelled ..... 32 gns.
(Any machine sent on "The Motor Cycle" deposit system.)

'Phone: Hamp. 5392. Hamp. 4904.

RIDER TROWARD & CO.,

Open till 7 p.m. and Sundays.

31, 40b, & 78, High Street, HAMPSTEAD, N.W.3.

One minute Hampstead Tube Station.

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., & Co., and crossed.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford.—A.J.S. Agents since 1912. Write us for your requirements. [9777

A.J.S., 2¾h.p., 1914, £35; wanted, 1913 5-6h.p. twin A.J.S., for cash.—3, Meriden St., Coventry. [X0176

1916 4h.p. A.J.S., in fine condition, back tyre brand new, lamp and horn; £65.—Crow Bros., Guildford. [9684

A.J.S., 2-speed, £35; 4h.p. twin, £65; 6h.p. combination, 60 gns.; E.P. or exchange.—Service Co., 292, High Holborn, London. [8750

A.J.S.—For the earliest possible deliveries of 1919 models, advance specifications and super service, try the A.J.S. Specialists, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0125

1914 A.J.S., 3-speed, 6h.p., perfect condition, thoroughly overhauled, good as new, 3 spare tubes, spare wheel, lamps, sidecar just enamelled and upholstered; 60 gns.; sacrifice; owner going Overseas.—Box L7,845, c/o *The Motor Cycle*. [9928

A.J.S. 6h.p. Combination, coachbuilt sidecar, 3 speeds, kick starter, hood, wind screen, late 1915 model, lamps, etc., not used for two years; any trial; absolutely as new; £90; seen any time.—Walker Cycle Stores, The Promenade, Mill Hill, N.W.7. [9904

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9189

WE CANNOT

offer you any new or second-hand Zeppelins or submarines, although time may show us some of these goods "marked down" somewhat.

WE CAN, however, offer you a selection of the best Second-hand Motor Cycles, Sidecar Combinations, and Light Cars in the Trade.

WE ARE booking orders for new models of

MATCHLESS A.J.S. NORTON
ENFIELD NEW IMPERIAL
B.S.A. HENDERSON P. & M.
LEVIS ROVER CLYNO.

Also

HILLMAN MORGAN & G.W.K. Light Cars

for a Cash or Exchange basis.

Second-hand Bargains include—

RUNABOUTS AND CARS.

MORGAN,	1916, M.A.G. engine, discs	£130
MORGAN,	1914, de Luxe, water-cooled, like new	£125
MORGAN,	1914, G.P., 80 mm. tyres, dark blue	£110
MORGAN,	1915, G.P., speedometer, brown	£125
MORGAN,	1914, sporting model, grey finish	£75
SWIFT,	1914, 7-9 h.p., lamps, being repainted	£130
MORRIS-OXFORD,	10 h.p., Limousine Coupé, dyna.	£325
G.W.K.,	1914, just overhauled, being repainted	£125
MATHIS,	1914, 7 h.p., clover leaf 3-seater	£175
BABY PEUGEOT,	1915, 6 h.p., 2-seater	£150

SIDECAR COMBINATIONS.

HENDERSON,	1914-5, 2-sp., 4-cylinder, many extras	£90
NORTON,	late 1916, 3-speed Combination	£80
HARLEY-DAVIDSON,	1917, Swan sporting Sidecar	£128
HARLEY-DAVIDSON,	1917, 7-9 h.p., magneto model	£125
HARLEY-DAVIDSON,	ditto, less accessories	£120
HARLEY-DAVIDSON,	1915, 7-9 h.p. Comb., as new	£68
ENFIELD	1914 6 h.p. Combination, 2-seater Sidecar	£60
ENFIELD,	1916, 8 h.p., 2-seater Sidecar	£82
ENFIELD	1916 6 h.p. Combination	£68
MATCHLESS,	1918, 8 h.p., standard war model	£115
MATCHLESS	1912 8 h.p. Combination, fixed gear	£23
SUNBEAM,	1914, 3½ h.p., all accessories	£64
SUNBEAM	1915 3½ h.p. Combination, as new	£80
SUNBEAM	1916 8 h.p. Combination, Lucas dynamo	£130
HUMBER,	1917, 8 h.p., flat twin, water-cooled	£84
INDIAN,	1915, 7-9 h.p., just been overhauled	£68
A.J.S.,	1916, 6 h.p., 3 speeds, detachable wheels	£100
P. & M.,	1914, 3½ h.p., wicker Sidecar, as new	£60

SOLO MACHINES.

RUDGE,	3½ h.p., special Isle of Man model	£40
ENFIELD,	1912, 2¾ h.p., 2-speed, chain-drive	£20
RUDGE	1914 Multi, 3½ h.p., requires repairs	£25
DOUGLAS,	1913 (late), 2¼ h.p., 2-speed	£32
DOUGLAS,	1914, 2¾ h.p., 2-speed, nice order	£36
LEVIS	1915 2¾ h.p. Popular Model	£22
ZENITH,	6 h.p., 1913, Gradua gear, and clutch	£35
RUDGE,	3½ h.p., 1913, fixed gear, very fast	£20
CONNAUGHT,	1914, 2½ h.p., 2-stroke	£18
NEW HUDSON,	1915, 2½ h.p., 2-stroke	£20
DOUGLAS,	1915, 2¾ h.p., 3-speed, and clutch	£52
NEW HUDSON,	1914, 3½ h.p., 3-speed, requires repairs	£20

LISTS GIVING FULLER PARTICULARS UPON REQUEST.

MAUDES' MOTOR MART,

100, Great Portland Street, LONDON, W.1.

Telephone: 552 Mayfair. Telegrams: "Abdicate, Wesdo, London."

MOTOR CYCLES FOR SALE.

Alldays.

NEW Alldays 2-stroke, 2-speed model; £46, complete; cash or deferred.—Harrods, Ltd., Brompton Rd., S.W.1. [9735

ALLDAYS Matchless 3½h.p. Combination, 2 speeds, Bosch, Sensspray, drip feed, good running order; £17/10.—Hayes, 344, Euston Rd., W.C.1. [9737

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8760

Ariel.

3½h.p. 1917 3-speed Ariel and coachbuilt sidecar; cost £96, with accessories, scarcely used; accept £75.—Bates, Quarry Cottage, Guildford. [9469

Bat.

6-8h.p. Bat-Jap Combination, 3 speeds, splendid condition; 50 gns.—E. Vessey, 4, Co-operative St., West Melton, Rotherham. [X0209

1914 6h.p. Bat-Jap, spring frame, fast and powerful, perfect condition; £28, or nearest offer.—Lewis, 84, Empress Rd., Derby. [X0191

Bradbury.

BRADBURY, 4h.p., late 1914; £39; used 12 months only.—George, 23, South Parade, Chelsea. [9921

BRADBURY, 4h.p., Philipson pulley, fully equipped; 25 gns.—Haynes, 223, Hammersmith Rd., W.6. [9994

3h.p. Bradbury, Simms-Bosch, B. and B., good tyres and belt, working order; £7.—Hanson, 1, Rehoboth, Spring Terrace, Rawtenstall. [X0216

1914 Bradbury Combination, gear box, kick starter, clutch, chain drive, underslung coach sidecar; £35, or exchange big single, Rudge Multi preferred, cash adjustment.—19, Kingsley Rd., Forest Gate, London. [9894

B.S.A.

1919 B.S.A.—Early deliveries at Briggs, Motor Agent Wellingborough. [X0120

B.S.A., 1913, 3½h.p., 2 speeds, with sidecar, in excellent condition; £35.—47, Streatham Hill, S.W.2 [9989

B.S.A.—Several combinations in stock, 1914, 1916 and 1917.—Service Co., 292, High Holborn, London, W.C.1. [9655

1917 B.S.A., 3-speed countershaft, and cancelet sidecar, complete; £70.—Briggs, Motor Agent Wellingborough. [X0119

4¼h.p. New B.S.A. Machines, 3-speed gear models, for immediate delivery from stock.—Wanchope's, 9, Shoe Lane, London. [9966

B.S.A., 1914, 3½h.p., 2-speed, pedal start, sidecar, lamps, accessories, in splendid condition; £35.—J. Dilliway, 3, Fife Rd., Kingston-on-Thames. [9895

FOR Sale, B.S.A., as new, 4¼h.p., late 1917, countershaft, 3-speed, mileage only 500 miles, not ridden this year; £60.—Write to 21, Emanuel Av., Acton, W.3. [9908

B.S.A.—For the earliest possible delivery of 1919 models, advance specifications and prices, sole district agents. The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0126

1915 B.S.A., 4h.p., 3-speed, kick start, clutch, chain-cum-belt, lamps, horn, nearly new Dunlops, plating and enamel as new, also accessories; price £45, bargain.—A. J. Bedford, 110, Oxford Av., Southampton. [X0085

Calcott.

CALCOTT, 1914, 2½h.p., new Pedley back, Dunlop front, enamel and plating like new, mechanically sound; £22.—Walbro Motor Works, Ely. [X0101

Calthorpe.

1916 Calthorpe, 2-stroke, lamps, and horn, splendid condition; £30.—Parker and Son, St. Ives, Hunts. [9985

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

CALTHORPE-J.A.P. 2¾h.p. Combination, cancelet sidecar, Enfield 2-speed, clutch, new Aug., 1917, handle starter, decompressor, American grips, 3 lamps, 2 belts, many spares, and all accessories, low mileage; £50, no offers.—Gilder, 7, Kingsway, Twickenham. [9885

Clyno.

CLYNO, 2-stroke, splendid condition; £18; owner joined up.—29, Wymond St., Putney. [9896

CLYNO 5-6h.p. Combination, Bosch mag.; £55; E.P. or exchange.—Service Co., 292, High Holborn, London. [8752

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; ditto, new single speed, £34; ditto, 2-speed countershaft, £41; E.P. or exchange.—Service Co., 292, High Holborn, London. [8741

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DOUGLAS, 1915, Colonial Model, 3-speed, perfect condition, with spare steel-studded tyre; £45.—Geall, 26, George St., Hove. [9874

DOUGLAS, 2¾h.p. models, two in stock, 2 speeds, clutch, tip-top condition throughout; £32/10, £40.—Parker's, Bradshawgate, Bolton. [X0223

DOUGLAS 1917, 2¾h.p., Admiralty Model, nearly new, all accessories; £60.—The Eastern Garage Co., 418, Romford Rd., Forest Gate, E.7. [9919

4½h.p. Model W Douglas 1916 Motor Cycle, with 2-speed gear and free engine, in excellent running order; £40.—Girling, Maldon, Essex. [9930

DOUGLAS 1916 Model, delivered new from works Nov., 1917, 3-speed, lamps, horn, tools, etc.; 50 gns.—Dr. Gee Williams, Hafren, Cefn Coed, Merthyr. [X0187

DOUGLAS 1915 4h.p. Combination, 3-speed, with lamps and speedometer, perfect condition, mileage 6,000; 60 gns.—Anderson, 22, Railway Rd., Leigh, Lancs. [X0205

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1917 3h.p. Enfield, only done about 200 miles, electric light, mechanical horn, 2-speed, K. starter, lovely order; 50 gns., lowest.—7, Park Hill Rise, Croydon. [9884

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1913 Excelsior, 4½h.p., 2-speed Jardine countershaft, new E.I.I. Dunlops, Bosch, Sensprav, coach car lamps, good order; £35.—252, Stafford Rd., Lichfield [X0192

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HARLEY-DAVIDSON 1915 Combination, electric lighting set, splendid condition; 65 gns., no offers; appointment—38, Camberwell Grove, Camberwell, S.E.5. [9941

1915 Harley-Davidson and Sidecar, 7-9h.p., 3-speed new tyres and chains, good condition, and mechanically sound; 60 gns., or near offer.—H. Picke, East Bridgeford, Notts. [X0189

HARLEY-DAVIDSON Combination, late 1915, like new, stored for two years, electric lighting, dynamo, speedometer, light car tyres, perfect in every detail; bought car; only wants seeing; 90 gns.—Orton, 47, Hale Lane, Mill Hill, N.W.7. [9869

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HUMBER Combination, 1914, 3½h.p., 3-speed, in first-class condition; £45.—47, Streatham Hill, S.W.2. [9990

HUMBER, 1913 3½h.p., twin, new Dunlop tyres and belt, all in good order; £16/10.—Walbro Motor Works, Ely. [X0092

3½h.p. Humber, 2-speed, handle start, B. and B., Bosch, low, perfect order; £20.—6, Montague Rd., Hackney Wick. [9948

HUMBER 3½h.p., Roc 2-speed gear, handle starter, splendid condition; £30, or nearest offer.—W. Askew, Crookham St., Crookham, Fleet, Hants. [9945

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INDIAN, 1915, 3 speeds, countershaft, as new; 40 gns.—895, Fulham Rd., S.W. [1009

INDIAN Powerplus Combination, 1915, 3 speeds; £80.—Wanchope's, 9, Shoe Lane, London. [9965

INDIAN Combination, in perfect order, twin engine; £38; room wanted.—85, Bulwer Rd., Edmonton. [1003

INDIAN, 4-5h.p., single-cyl., 2-speed gear box; cheap, or exchange.—Haynes, 223, Hammersmith Rd., W.6. [9993

1915-16 Indian, 5-6h.p., 3-speed, kick starter, as new; £56.—Vyse, Ward A1, 3rd General, Wandsworth. [1002

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1915 Indian Combination, 7-9h.p., 3 speeds, lamps, mechanical horn, ample tools and spares, condition as new; £70.—W., 54, Gayhurst Rd., Dalston, E.8. [9875

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1916 Indian 5-6h.p. Combination, Phœnix underslung sidecar, torpedo shape, 3 speeds, kick starter, lamps, mechanical horn, all red; 60 gns., or exchange for Douglas, cash adjustment.—Waddell, Billsington, Ashford, Kent. [9937

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1914-15 7-9h.p. Indian Combination, speeds, K.S., electric lighting, speedometer, perfect condition; 58 gns.—Dyer, North St., Ashton Gate, Bristol. [9956

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3½h.p. 1916 Twin James, 3-speed gear, £57/10; also a 3½h.p. 1914 model, £48.—Wauchope's, 9, Shoe Lane, London. [9962

RIDER TROWARD and Co., 31, High St., Hampstead.—James; immediate delivery new 5-6h.p. and 4½h.p. combinations; James 1914 canoelet combination, 4½h.p., 3-speed, 49 gns. [9642

1917 James 3½h.p. Twin, 3 speeds, kick starter, electric lights, horn, speedometer, etc., very fast, and in excellent condition; £45.—Rowell, Dean Farm, Woodcote, Reading. [X0131

J.A.P.

1910 6-7h.p. J.A.P., less magneto; accept £9.—R. Thompson, 7, Derwent St., Sunderland. [X9968

Kelecom.

3½h.p. T.T. Kelecom, B. and B., good tyres, complete, less mag.; £8, offers.—Barnes, 83, Trinity Rd., S.W.17. [9882

Levis.

LEVIS, 1915 model, 2¼h.p., first-class condition; £22.—Hopkins, New St., Ledbury. [X7264

LEVIS 1914 Popular, lamps, horn, etc., smart little bike; £24.—Walbro Motor Works, Ely. [X0095

LEVIS, 1917 model, new machine, slightly shop-soiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St., Ledbury. [X7263

1915 2¼h.p. Levis, single speed, lamps, horn, in good condition; £24.—76, Victoria Rd., Harlesden, N.W.10. [9939

1916 Baby Levis, large Lucas lighting set, Lucas horn, aluminium footboards, knee-grips, new tyres; 20 gns. for quick sale.—86, Hamilton Rd., Wimbledon. [9897

LEVIS.—For the earliest possible delivery of 1919 models, advance specifications of all models, sole district agents, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0127

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MATCHLESS-J.A.P., T.T. model, fine machine; great bargain, 20 gns.—Speechley, 1, Gunnersbury Lane, Acton Hill. [9957

8h.p. Matchless Combination, dynamo lighting; exchange lower power, or sell.—Clifford Rowley, Rushall, Walsall. [X0134

MATCHLESS, 3½h.p. twin, J.A.P., 3-speed, kick start, Binks, Bosch waterproof, tyres and belt good, good mechanical order; £33.—Walbro Motor Works, Ely. [X0102

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RUDGE Multi, 3½h.p., new Palmer cord tyre and tube, brand new back wheel, 650×65, ready ride away; nearest offer to £34; seen 8.30 a.m. to 1.30 p.m. any day.—F. Wilson, 1a, Farman Rd., Hopton Rd., Streatham, S.W.11. [9926

RIDER TROWARD and Co., 31, High St., Hampstead.—Rudge Multi, brand new, 3½h.p. standard, 62 gns.; Rudge Multi, 1916, T.T., I.O.M., very fast, 59 gns.; Rudge Multi, 1916, 3½h.p. standard, 47 gns.; Rudge Multi, 1914 standard, 33 gns.; Rudge Multi, 1913 standard, 27 gns. [9650

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The Competitions of 1919.

COMPETITION enthusiasts must not expect next year to be as prolific of competitions as 1914, though the majority would doubtless like it to be so. There are many difficulties in the way of the manufacturer, on whom, as on all of us, peace has been thrust as suddenly as war had been just over four years ago. During the first six months of the year, at any rate, the motor cycle builder will have to set his house in order, change over from war work to his original occupation, arrange his output on a production basis, test his new models thoroughly before placing them on the market, and gather together a squad of expert testers, most of whom are now in the Army, to assist him in his work. Only a few firms are really ready to supply the public so soon as they are free to do so, and it would be obviously unfair to rush competitions and give these makers an advantage over others who are not in so fortunate a position. It does not seem likely, therefore, that there can be much in the way of competitions before the middle of the year, and that will leave time only for the more important events.

That the T.T. race can be held next year is, we consider, highly improbable. It must be held early in the summer, before the Isle of Man becomes too crowded: so it would not be fair to ask manufacturers to hurry through special machines when their whole attention must be given to the output of standard models for which prospective customers are even now clamouring.

The London-Edinburgh run, held at Whitsuntide, is a different proposition. It is hardly a serious trial, no marks can be lost for unreliability, but only for being late on a very generous timetable. The course is a long one to take at a stretch, but is very easy and presents so few difficulties that pre-war machines have as good a chance of getting through as the latest productions, and it is merely a matter of the riders enduring the fatigue (and plenty of Grade III. men have done that already) and keeping to schedule. It is, however, a thoroughly sporting and popular event.

By far the most important competition of all is the Six Days Trials, which certainly ought to be held next year. It will be badly needed to test not only 1919 standard motor cycles, but military models, the new runabouts, and machines suitable for the Overseas market. It could be held early in August, and such a date would give the makers plenty of time to prepare for it. We publish on another page several very happy suggestions regarding this trial from a correspondent who proposes the inclusion of pre-war mounts, as well as those mentioned.

Perhaps later in the summer the B.M.C.R.C. might resume its activities at Brooklands, and there might be some interesting races for T.T. machines. There is, however, one important competition, of a more or less purely sporting nature, which should certainly be run off in 1919, and that is the Arbuthnot Trophy. The gallant admiral in whose memory it was founded met his glorious death in May, 1916, in the Jutland battle, and it is due to his memory to run off the event at the earliest possible moment. It would be interesting to make the event a team competition, each team bearing the name of the ship in which its members were serving, while in the case of small craft each of these types might be represented by one team.

The suggestion recently made to us of a competition for despatch riders mounted on military models who have not competed in a previous event strikes us as being a very good one, and well deserving of support.

The trade has suffered greatly in the last four years, and requires the maximum amount of time in which to recuperate. It would be quite unfair to impose on it greater burdens than are absolutely necessary for the encouragement of the pastime and the development of the motor cycle.

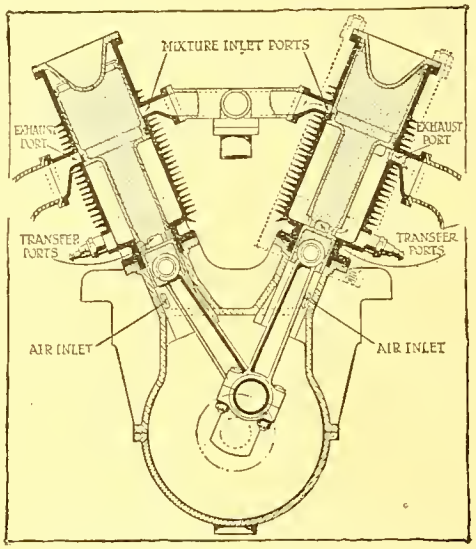
An index to the advertisements in this issue will be found on the page facing the back cover

A V TWIN TWO-STROKE.

An Interesting Design embodying Provision for Air Scavenging.

UNDOUBTEDLY one of the most interesting two-stroke engine designs is that of Mr. Bruce Harding, which is illustrated here, and although designed for cars, it is of a type which easily could be adapted for use in motor cycles.

Probably the greatest fault of the simplest and most conventional two-stroke design is its poor economy as compared with the four-stroke engine. This is due to several things. In the first place the compression cannot be carried so high as in a four-stroke. Secondly, the poor scavenging impairs the value of the mixture. Thirdly, some of the mixture is lost through the exhaust port.

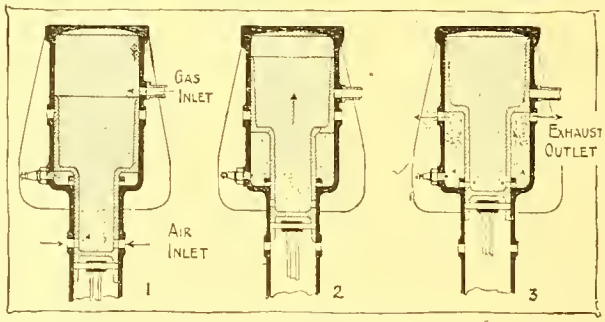


The Harding two-stroke two-cylinder air-cooled engine.

Arrangement of Ports.

It has been demonstrated many times that of all the arrangements of ports in a two-stroke cylinder that having the inlet and exhaust openings opposite to each other is the worst on the point of economy. Probably the best arrangement is to have the inlet and exhaust ports at opposite ends of the cylinder, and in this design this is done.

The novelty of the Harding design, however, lies in its inverted truncated piston. The accompanying illustration shows the arrangement. It will be seen that the piston is open at the top, closed at the bottom, and has the lower portion of considerably less diameter than the top. The lower part or trunk of the piston runs through a guide in the upper portion of the crank case, and is equipped towards its lower extremity with transfer ports, which, when the piston is at the bottom of its stroke, register with, and admit air through, corresponding ports in the guide. The upper, full-diameter portion of the piston, as well as the trunk, is provided with rings.



Section of a cylinder of the Harding engine showing the inverted truncated piston and its operation.

Reversal of the Piston.

There is below this upper portion a combustion chamber, represented by the annular space between the cylinder wall and the outer circumference of the piston trunk. It is in this annular chamber that the explosion occurs, and, contrary to usual practice, the explosion pressure exerts its energy in driving the piston upwards, so that the connecting rod on the firing stroke is in tension instead of in compression.

Having touched upon the design, we will now follow the cycle of operations.

Towards the bottom of the downward stroke of the piston the inlet port in the cylinder wall is uncovered, and through this port the new charge enters, filling the top of the cylinder above the piston with explosive mixture; this finds its way down inside the hollow piston itself, into the truncated portion of which pure air is simultaneously admitted through the transfer ports already referred to.

The Transfer Arrangement.

The inventor claims that, while the upper part of the piston is filled with gas, there is in the bottom of the trunk a charge of pure air, which has been admitted from the crank case when the piston has reached the bottom of the stroke..

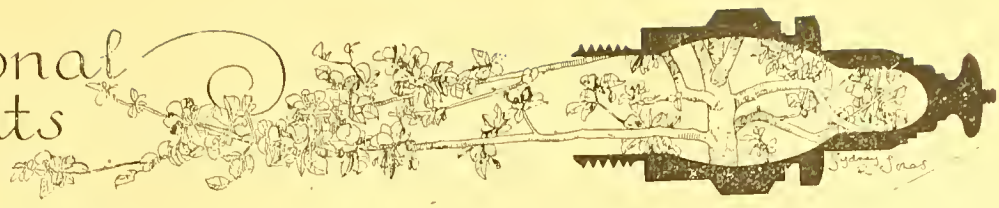
As the piston travels upward under the force of an exploding charge the fresh mixture is compressed in the upper part of the cylinder and in the interior of the piston; in fact, when the latter reaches the highest point of its travel, the entire new charge is contained within it. At this point, however, the transfer ports in the piston trunk no longer register with the air ports in the guide, nor are they now shielded by the walls of the guide; through these transfer ports, therefore, the charge within the piston can make its way into the combustion chamber. But the first thing that enters the combustion space is pure air, which forms a layer between the burnt gas and the fresh mixture.

Cooling.

Another interesting point about this design is that it is internally as well as externally cooled. Also, it should be noted, the volume of the pump (the truncated piston) is greater than that of the combustion space. The pump is also charged simultaneously at two points, top and bottom, which should facilitate a full charge being drawn in at high speeds.

We understand that one of the largest makers of H.O.2 models will increase the power of its machines for the new models. The solo mount will be a 3½ h.p. The larger model may be expected to comprise a very completely equipped 6 h.p. combination, with spring frame, sprung sidecar wheel, detachable interchangeable wheels, and electric lighting throughout.

Occasional Comments by "Ixion"



A Slow-dying Fallacy.

IT is queer that so many motor cyclists persist in imagining that a weak mixture means a cool engine, and that an engine which fires its sparking plug cable at a range of six inches must be suspected of a rich mixture. The truth is that a weak mixture burns comparatively slowly, and that the exhaust valve—and possibly the inlet valve as well—is thereby subjected to flame for an unnecessarily lengthy period. I cannot go so far as to say that I have ever converted a short-lived valve into a nonagenarian by resetting the carburetter, but a slight enrichment of the mixture will often keep the compression joints tight for an increased period, and occasionally has miraculous effects on the running of two-stroke engines. A slow-burning mixture can obviously get in its deadliest work on engines which suffer from such imperfect scavenging as is the doom of the average two-stroke. Many riders suffered from the trouble indicated above during the early stages of the petrol famine, before control came in, when we were all lying awake at nights dreaming of 200 m.p.g. Every motor cyclist is familiar with the type of overheating produced by a worn exhaust cam or inadequate exhaust tappet clearance. The phenomena in such cases include false valve timing and other disturbances, but imperfect scavenging and prolonged subjection of the valve to flame enter into the trouble. Its affinities with a weak mixture and the common system of scavenging on two-stroke motor-cycle engines are evident.

Another Lie that Dies Hard.

MOTOR cyclists as a class suffer from another delusion. Many of them blithely imagine that at, say, half throttle opening a given carburetter jet always passes a fixed amount of petrol, and that this fixed amount of petrol is mixed with a variable quantity of air, according to the position of the extra air lever and valve. The fact, of course, is that the opening of the extra valve slide or piston relieves the suction in the spraying chamber, and consequently less petrol is drawn out of the jet. Nevertheless, many a motor cyclist's sensations in handling his air lever are parallel to his indecision as to whether a whole or a half tablet of saccharine will make a fixed quantity of tea more palatable.

Yet Another!

A MORE pardonable and more pathetic illusion centres round the speedometer readings, which are always taken as gospel. A few cynical individuals, indeed, regard American speedometers as liable to become untrustworthy after 1,000 miles, and here and there you may meet a fastidious rider who will only dogmatise about his speed when he has checked it against a Bonniksen or some special make which he happens to venerate. The simple truth about the best of our speedometers may be tersely expressed:

(1.) The best of them cannot be accurate over its whole range, even when new

(2.) You cannot read it with precision at 50 m.p.h., even if it were accurate

(3.) The above errors are multiplied by X, because there are no British roads on which any rider can maintain his maximum speed for more than a few hundred yards. When a speed test of 400 yards is expressed in terms of, say, 60 m.p.h., error is gorgeously magnified

(4.) The best speedometers rapidly lose their initial accuracy.

What is a Speedometer for?

THE preceding paragraph implies what no technician would dispute—that as an exact recorder of illegal speeds on public roads the best speedometer is a ludicrous makeshift. The plain man may convince himself by trying to reproduce his best speedometer gait against the relentless electric chronograph at Brooklands. Of course, the last piece of information which any normal motor cyclist desires to obtain is his actual maximum speed. Most of us would be broken-hearted if we knew it. We obtain an approximate record over a short distance from our speedometer. We introduce an error of X in converting that record into terms of m.p.h. A sanguine spirit of self-delusion, enhanced by pride of ownership, adds on about another 10% as the information travels to the appropriate pigeon-hole in our brain. By the time we begin bragging after a second cocktail our machine has verily blossomed into "some 'bus." Thus *any* speedometer is well worth its cost. It keeps our interest alive and our tails up. In quite other directions it is of real scientific assistance. It is invaluable in checking adjustments. It is quite a reliable distance recorder—the worst I ever struck was not more than 200 yards out in each mile, and had been fitted by a fool. It assists us in humbugging the guardians of our extremely foolish road laws. But I had forgotten—speedometers are still rather a tender subject with me.

A Dilemma.

THE Rev. J. M. Philpott suggests that the carburetter air intake should be tipped with a funnel shaped to fit round the back of the cylinder, so that the suction might draw a strong cooling current over those fins which are usually screened. This is, of course, an old dodge for heating the carburetter, but is useless for cooling the engine. If the mouth of the funnel were small, and the draught as great as our correspondent considers, a patch of the cylinder wall, equal in area to half-a-crown, would be cooled, while the surrounding part of the wall would remain about as hot as usual; a new cause of distortion would be imported. On the other hand, if the mouth of the funnel were large, the suction would not be powerful enough to have such valuable effects

SHAFT TRANSMISSION.

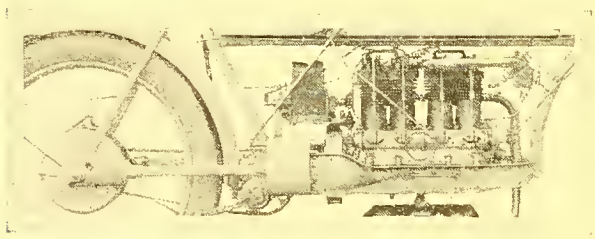
Some Notes on and Illustrations of Shaft-driven Machines.

PROBABLY there is not a designer of cars who does not regard belts and chains on motor cycles as a transient stage in the development of the machine. He thinks that sooner or later the single track machine will follow the mechanical principles of the car, with water-cooled engines and shaft transmission.

The shaft is regarded as an ideal transmission for the machine of the future, but it is questionable whether the car designer could produce a motor cycle embodying it which would meet with the all-round approval of the motor cycling world.

The American Bailey Flyer, the only flat twin with shaft transmission. In this case two sets of bevel gears are necessary.

With the car, the shaft has come as a natural development. It is the simplest form of transmission for a four-wheel vehicle having its four-cylinder engine at the front and driving an axle at the rear. On a motor cycle it is an entirely different proposition.



The Bock and Hollender, a Dutch shaft-driven four-cylinder machine.

Instead of being the simplest design, it is the most complicated, and its embodiment means drastic alterations in design.

In the shaft-driven car the power is transferred from the engine to the road wheels by one pair of gear wheels only. This is impossible with a motor cycle for the reason that the road wheel is on the centre line of the machine. The only way to imitate the car in this respect is to have the engine off the centre line, which is not desirable, although perhaps in the case of a sidecar machine the only disadvantage would be in the point of accommodation. It will be remembered that the lay-out of the Scott Sociable is on these lines, but this machine cannot be regarded as a sidecar combination.

Taking present-day engines as representing standard types for some time to come, we find on consideration that only vertical engines are adaptable to shaft drive. Present-day vertical types are singles, side by side two-strokes of the Scott and Allon types, and four-cylinder engines which, at present, no English firm is marketing.

It appears tolerably certain that shaft transmission will not be considered in connection with single-cylinder machines. Although the F.N. lightweight was quite a successful machine, this size of engine is not likely to appeal to the English designer who wishes to produce an up-to-date motel, and on the larger singles the drive would be harsh, although with an efficient shock absorber it should be as successful as a chain.

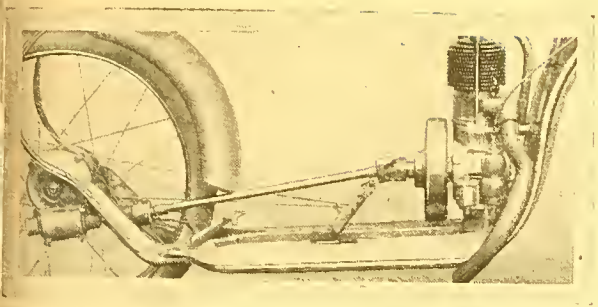
The Pierce, one of the several American machines having shaft transmission. Note that the shaft is enclosed in the stay.

At first sight it would seem that the shaft need not give any more rigid drive than a chain. Theoretically this is true, but in practice there is a great deal of difference between the two.

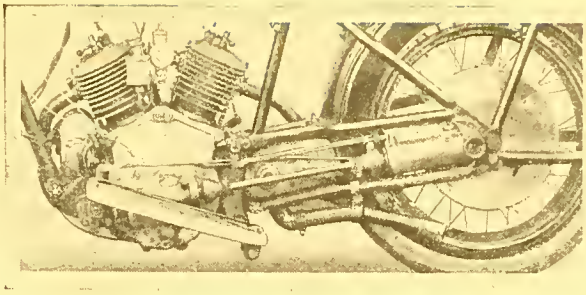
When we come to twin engines, only the side-by-side types are suitable for shaft transmission. The side-by-side four-stroke no longer has a place on the market. As in the case of the four-cylinder vertical engine, the drive first has to be taken to the side, and while this may not be a very serious disadvantage, the fact remains that in "top gear" the drive is being transmitted through two pairs of gear wheels, spur gears at one end and bevels or worm at the other.

The 7-9 h.p. F.N. The last model of the famous Belgian concern which produced several shaft-driven machines.

Shaft Transmission.—



The Wall, one of the few British single-cylinder motor cycles to which shaft drive was fitted.

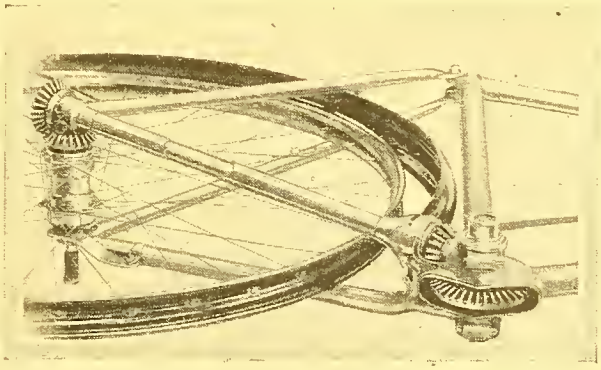


The transmission of a specially built Rex, in which the V-twin engine is retained in its conventional position. The Humphris gear was used.

Both a V engine and a flat twin would be awkward to place in the front so that the crankshaft is lengthwise with the frame. The length of the flat twin makes this position almost impossible, and the only opposed twin with shaft transmission, the Bailey Flyer, has the engine in the conventional position, and the drive is taken to the wheel *via* two pairs of bevel gears. To say the least, this cannot be regarded as ideal, as right angle drive is admittedly a source of power waste and to duplicate it is not a step in the right direction, especially when we remember that with chain or chain-cum-belt drive no corners have to be turned.

The V engine is not so impossible in this respect, and, as one of the illustrations shows, the transverse position of the cylinders in no way is as awkward as might be supposed.

In the Rex design we have a V twin with shaft transmission arranged as on the Bailey Flyer, but in this case bevels are not used, as the Humphris gear was embodied which, roughly, is a series of "knobs" working in corresponding holes in a disc. Unfortunately for the development of shaft transmission, designers in the past have not fully appreciated the value of simplicity in appearance. Some shaft-driven machines are almost a car on two wheels and much heavier than a motor cycle should be. However, there have been neat designs, and among these the Bock and Hollender of 1906, the 4-5 h.p. F.N., and the American Pierce are good examples. In all these designs the shaft is enclosed in one of the rear stays following the practice of the shaft-driven pedal cycle which at one time promised so much. The 1915 Rover bicycle is the most modern of the latter type, and the photograph reproduced here shows how simple and neat it is. In passing, this design may appeal to the maker of the ultra lightweight or the motorised bicycle.

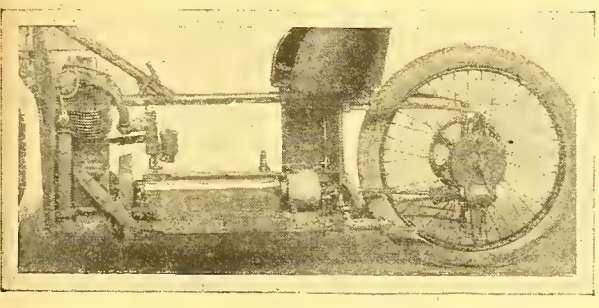


The shaft drive of the Rover pedal bicycle, a particularly neat transmission adaptable to the small lightweight motor cycle.

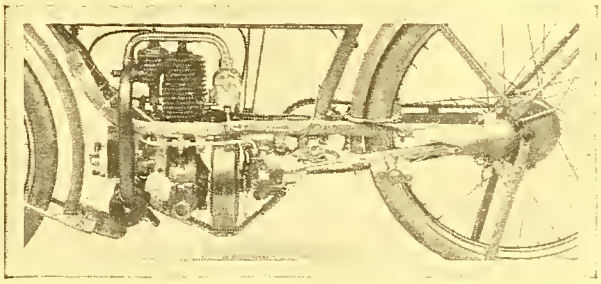
The single-cylinder F.N. and the 7 h.p. model have exposed shafts, as have also the T.A.C., Rex, Wall, and Durkopp.

When we consider the four-cylinder engine it is usual to think that the shaft will be the transmission considered by designers, but here again it is an open question whether the shaft will be developed with the four-cylinder engine. The American Henderson with its final chain drive does not seem to require a shaft to complete it. In any case, we may assume that only when the four-cylinder and the side-by-side two-stroke engines have progressed beyond their present stage will the shaft be considered seriously. But for singles and V twins there appears to be no reason to believe that the shaft will be embodied in many new machines for several years to come, even if motor cycles are developed more along the lines set down by our car designers.

VEDETTE.



A shaft-driven T.A.C. with a V type twin engine.



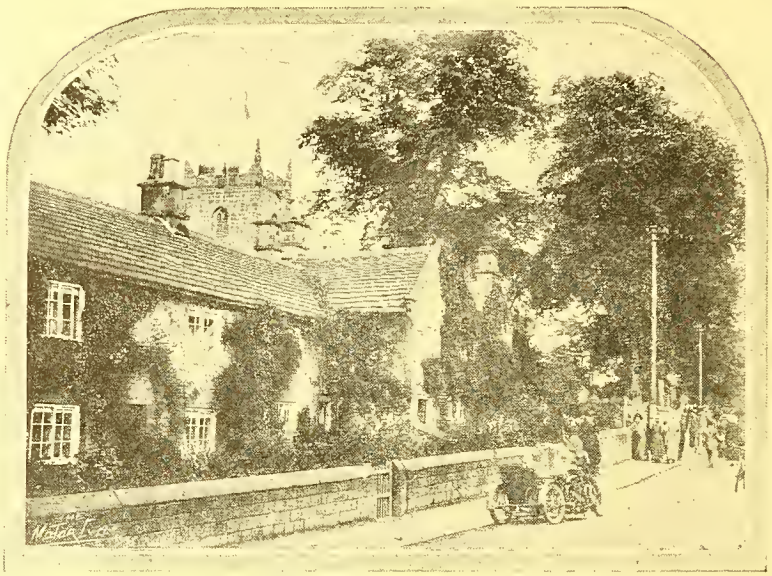
The 2½ h.p. F.N., a successful single-cylinder motor cycle with shaft drive.

MOTOR CYCLISTS AND THE ELECTION.

A Plea for a Reasonable Motor Law.

IN the general overhaul the country is to receive in the coming days of reconstruction, we may surely claim that the present motor laws need attention. They are a survival of days when horse-drawn vehicles were still the main users of the road, and were drawn up as a kind of toleration act for a troublesome minority, the motorists.

We have changed all that. The new age will be the mechanical age, and the horse will be in the minority. Is it not time to meet the new era by revising our obsolete motor laws? Why should not every motor cyclist ask before he votes if the candidate is prepared to see justice done to the motoring community?



"The candidate will perhaps want our sidecar on polling day"

We have a two-fold claim. We have had our hobby suspended for over a year. No other sport or occupation has shared that fate. Golf, fishing, shooting, tennis, and cricket, have all been possible. The man who spends his Saturdays watching football has still had football to watch. The motorist alone has suffered eclipse, but he has not grumbled. He has taken it all in a good spirit. Now he claims his reward. Moreover, if the candidate wants, as perhaps he will want, our sidecar on polling day, have we not a claim that he return us a *quid pro quo* by promising to support the amendment of the Motor Car Act?

A Reasonable Motor Law.

A reasonable motor law will demand first and foremost the abolition of the speed limit. It will be best to recognise no limit at all, but to make any speed which causes actual danger, not imaginary danger, to the public an offence, and any speed which does not do so, permissible. There are crowded city streets where on a Saturday night twenty miles an hour is highly dangerous. Yet the law permits it. There are open roads where sixty miles an hour is safe, and the law punishes a man for exceeding twenty upon them. The twenty-mile limit is arbitrary, artificial, irritating, and broken by every motorist in the country. It is a direct survival of its predecessor, the twelve-mile an hour limit, and should go the same way as its ancestor.

If it be thought necessary to have speed restriction in certain areas, it would be far better to mark them as railways commonly do, by a single sign "Reduce speed," leaving it to the driver to judge what reduction is required. It is obvious that in a quiet part of the day it is not needful to slow down to the same extent as in the middle of market day, shall we say, in passing a country town. The present "flat rate" of ten miles an hour (sometimes five!) is absurdly unequal, applied to all places alike. In any case, modern brakes make fifteen miles an hour perfectly safe, even in busy narrow streets, and that is a speed that can generally be maintained on top gear without crawling in second, as is usually the case if a ten-mile limit is to be obeyed. We must press for an abolition of the legal maximum, and a reasonable and sane policy regarding restriction, each case being considered on its merits, with no uniform rate enforced everywhere.

The Cross-roads Danger.

Another point needing attention is cross-roads. It should be recognised clearly that the driver on the main road has the first right, and those coming from side roads must be responsible for seeing a clear way before turning into the main road. Signs should be put up indicating this in cases where there is any doubt which is the main road and which the by-road at a turning. A large number of accidents would be avoided if the law enforced this in preference to the legal limit system on straight stretches, which is its present assiduously performed task. A further point is lighting. One must admit that the head lamps used by many drivers are a nuisance and a positive danger, dazzling the eyes of the approaching driver and making it impossible for him to see where he is going for a second or two after he has passed them. There is no objection to powerful lights whose beams are cast down. If, as is likely, some regulations affecting lighting are enforced, it is this point, rather than the reduction of brilliancy, that should be considered.

The vast majority of motor cyclists would welcome a regulation that a driving licence should not be granted until the driver is competent to drive. Until such competency is attained, the tyro should be accompanied by an instructor who has power to manipulate the controls if needful. If it be objected that this would be very difficult in the case of a solo rider, it can be explained that in such instances private ground must be chosen as the practising school. The public road is not the place for the learner. At

Motor Cyclists and the Election.—

present the blind, the deaf, and the imbecile can be licensed to drive if they pay five shillings.

The question of taxation arises next, and we must insist that the motor cycle is increasingly a necessity, not a luxury, and as such should not be crippled by taxation as a luxury, by the present heavy petrol duties, which call for reduction, or by an increased Revenue licence. The present tax of £1 is certainly rather anomalous when one recollects it applies alike to an Auto-wheel and a Morgan, but, if any change is made, it should not only be based on horse power, but on value. It is absurd to pay the same tax on a 1910 machine bought for £15 and a 1919 bought for six times that sum. Under the circumstances, perhaps, the present tax is best left alone. It is not perfect, but it is less unjust than many suggested substitutes.

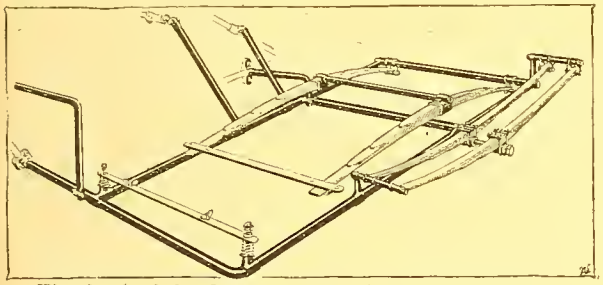
Finally, registration and transfers might be simplified. There is a lot of needless red tape in connection with the process. It would simplify matters if in the first case the makers registered the machine and put a permanent index mark upon it. The buyer would then simply notify a central authority that such and such a number was his, and no more would be required until, when it was sold, the next buyer took the same course, paying a nominal fee if necessary. The present time-wasting process of applying, getting number plates painted, finding out what county council is denoted by the letters XYZ and where to write to, and all the other tedious business involved, would be swept away at one stroke. Moreover, the permanent letters and numbers affixed by the maker would be much neater than the present arrangement, and it could much more easily be rendered luminous at night. In this connection, by the way, what harm would there be in luminous paint like the dial of a watch instead of the precarious light from a tail lamp?

The writer is only expressing his own opinions in these suggestions, and does not expect that they will be agreed upon by all his comrades in the motor cycling world. But surely we might all unite in demanding a revision of the Motor Car Act in the interests of the motorist, and in particular for the abolition of the grandmotherly twenty-mile rule. We shall find candidates very gracious this week and ready to consider all we lay before them. Now is our chance to ask our little question, and see if we cannot get a promise of reform. PHANTOM.

A PEACE MODEL SIDECAR.

The First of the New Sidecar Designs.

THE problem of springing the sidecar has been vigorously tackled by Messrs. Grindley, Ltd., of Melbourne Road, Coventry, and, despite very adverse conditions prevailing during the war, many experiments have been made with various springing systems and chassis designs. Before the war Messrs. Grindley were sidecar manufacturers to the trade, and while this side of the business will be retained, it is intended to enter the open market with a new sidecar of very attractive design.



The chassis of the Grindley sidecar, showing the double set of springs.

The model we saw had been built specially for Harley-Davidson machines, but this is only one of the types which will be marketed. The same chassis design will be embodied, but Indian and Harley-Davidson models differ slightly in the method of connecting the chassis to the motor cycle frame.

The main feature of the Grindley design is the method of separately springing the wheel and the passenger load. Semi-elliptic springs are used in the former case while half-elliptic cantilevers are embodied for the body.

The frame is rectangular, and in the Harley-Davidson model the front tube is extended to connect directly with the cycle frame, as is usual with Harley-Davidson combinations. In addition, there is a front tube connection, which is adjustable as to height on the cross member. The other connections are to the chain stay, to the rear stay, and to the seat-pillar. The two last named are straight, while the first mentioned is cranked on account of the chassis being at a lower level than the chain stay.

The wheel is supported between two springs, which are carried on arms at a higher level than the rectangular frame and are shackled at the rear. The wheel hub is fitted with a knock-out spindle for easy detachment, while the removal of two nuts on the spring bearings allows the wheel to be withdrawn. It is possible, however, to take out the wheel without removing the outside spring if the sidecar is jacked up.

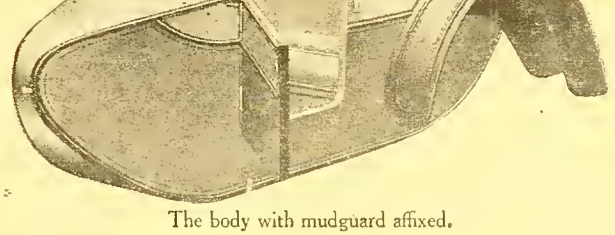
The Body Springing.

We think the makers have decided wisely in springing the body in addition to the wheel. The idea followed is that which is responsible for fitting sprung saddles on spring frame machines. The one set of springs absorbs the shocks transmitted to the machine, while the other provides extra comfort for the rider.

In the Grindley design a distinct departure is made by embodying cantilever springs. It will be seen from the illustration that these springs slide on rollers at their rear end and also slide in carriers on the body at the forward end. The centres of the springs are connected to a tubular member, which is secured to the body at a point where an angular steel member crosses it beneath the seat. This makes a very strong construction.

At the front the body rests upon a cross member, which is supported on the "chassis" by coil springs with smaller springs above them to damp out rebound. By the removal of two wing nuts (shown in the drawing) the body can be drawn off the frame without the use of tools.

The body is a very pleasing design, with a wide mudguard secured to its side panels, while the top panel and those along the top of the sides are of aluminium, which, with the blue paint, gives the sidecar a very handsome appearance.



The body with mudguard affixed.

IMPRESSIONS.

The Trade and the Change-over from Munitions to Motor Cycles.

Increased manufacturing facilities of the industry. Abnormal conditions will not be exploited when prices are fixed. Concentration a stronger keynote than before the war.

THE trade will be glad to resume business with the general public. That is one's outstanding impression after several dozen calls upon the leading motor cycle manufacturers since the Armistice. That there is something more than plain business acumen behind these manifestations of pleasure that war contracts may soon come to an end is made clear in the way in which the manufacturers welcome the first signs of new conditions. As a business proposition, probably munitions have "paid" as well as, or better than, motor cycles, but dealing with Government is not like selling to the public, and the making of aeroplane parts and lorry or tank sundries has not the same interest as producing something for people who are not in the abstract.

Monotonous Work.

During the war we have kept in close touch with the trade, and we have silently sympathised with engineers who have tried to enthuse over some new unit which they have been called upon to make to drawings supplied by someone else, and which, in many cases, have not even had a name. After all, there is little satisfaction in making a thing one cannot see in operation and which may be known as Part S.U. 1,200X. To those men who have been accustomed continually to improve their products upon the experience gained under personal observation this repetition work has been monotonous, to say the least, but with fine patriotism they have tried hard to be enthusiastic and diverted their mechanical abilities to such things as easier, more rapid, and cheaper production.

Undoubtedly many lessons have been learned, and when war contracts are no more they will be applied, to the benefit of all concerned, to the output of normal productions.

Probably no one outside the inner circles of these "munition factories" will ever know the many irritations these "gentlemen of the trade" have had to put up with, and when we sing the praises of Tommy and Jack we must not forget the men the world has come to regard as lucky munitioners.

Personally, we are not surprised that makers are eager to "change over," we have seen some of them in the depths of despair over things they could not explain to us; we have noted their helpless demeanour when we have endeavoured to solicit information concerning post-war plans. What could they say? At times it seemed that the war would go on for several years, and goodwill was drifting away with the men from whom its value was derived. The Man Power Bill and munitions regulations made any experimentation almost impossible. Men of military age absolutely refused to do anything that was not "Government work," the dilution officer was recognised in every visitor to the works. The use of certain materials was prohibited even if one had them, while those who had no stock could not procure them.

Motor cyclists may know that those who have been able to experiment have done so under the most adverse conditions. As an example, we once called upon a sidecar manufacturer who was endeavouring to put together a chassis of new design. The only tubes available were "bends," and to make up the chassis referred to, which incidentally had not a bent tube in it, it was necessary first to straighten the curved tubes.

At one time "Government work" sounded nice on the tongue of the ambitious works manager; to-day, it is another story. As regards those firms which have maintained an output of motor cycles for John Bull, one did not expect the same enthusiasm at the prospect of a change over from war orders to peace orders. Strange as it may appear, these concerns, far from being in the enviable position they are thought to be in, apparently are in a worse position to look ahead. So far there are no signs of war contracts being cancelled, and they are not in the position to make plans for immediate deliveries.

Prices to be Moderate.

Everywhere we found an undoubted desire to settle down to "normal" business with the rider and great efforts are being made to obtain release. One thing in particular pleased us very much to note. If Government contracts are cancelled and war-time models released for the public, *there will be no attempt to exploit prevailing conditions with high prices.* War-time models, if they are distinct from post-war machines, will be sold as low as possible, and, while their prices may be higher than those we were accustomed to pay before the war, the increase will only be in keeping with the extra cost of materials and labour during the war. In some cases we think that the same ratio of profit will not be demanded.

Our next impression is the great extensions which have been made to nearly every factory in the trade. Some are fully twice their pre-war size, while others are installed in entirely new works equipped with the latest machinery. Taken altogether the industry should be in a position to turn out much larger numbers of machines, and, in view of the immense possibilities of the Overseas trade, this will tend to reduce prices once the industry has settled down again.

Further, we have found that the advantages of concentration upon one model are now fully appreciated by a large number of firms, and as their works' facilities and organisation are now more suited for

Impressions.

mass production greatly increased outputs may be looked for in several directions.

There are quite a number of "Hush!" models well past the experimental stages, but they must necessarily remain "Hush!" models, and the general public may not see them until the trials next summer and afterwards at Olympia.

Many new models are not yet through the drawing office, but from what we have seen we can promise motor cyclists that most of the "real peace models," as distinct from those which will be marketed almost immediately, will be superior to the pre-war types, good as they were.

In our visits to the factories we have frequently come across large retailers from London and the Provinces who are endeavouring to solicit information concerning deliveries, and everywhere one has been forced to feel that a great, not to say unprecedented, boom is pending.

Finally, we were pleased to receive the thanks of members of the trade for the manner in which *The Motor Cycle* has "carried on" during the trying period now slowly passing away. We are credited with having maintained our pre-war standard and enlarged the fraternity of motor cyclists at a time when it was expected that the interest of the riding public would be diverted into other channels.

Which Type?—What the Referendum is Showing.

READERS' IDEAL SPECIFICATIONS.

THE referendum undoubtedly has proved an unqualified success, and exceeded our most sanguine anticipations. Specifications continue to pour in by every post from all parts of the British Isles, France, Belgium, and the Channel Islands.

As proof of the definite and intelligent interest taken by the readers of *The Motor Cycle*, numerous forms are accompanied by detailed particulars, ideas, and suggestions, many of which we hope to publish later. The diversity and originality revealed show that the individual specifications have been compiled from actual personal ideas and not as likely propositions to suit every other one. This, of course, was to be expected to some degree, but the defining of steam engines and radial engines as ideal specifications did come as a surprise from one or two readers. For instance, one man, a frequent contributor to our Correspondence columns, boldly states a 10 h.p. single to be his ideal machine, and gives a clear and concise list of reasons for his admittedly revolutionary choice.

It is very gratifying to find both riders and the trade not slow to commend the scheme, and many congratulatory letters have been received eulogising a step which places the real and definite requirements of the motor cycling public before the trade, giving the latter some data upon which to base their future plans.

The competition side of the scheme has also proved very popular, and many novel ideas are set out in detail, most of them covering several sheets of paper.

It is also interesting to note that, despite the many and varied requirements, some features stand out well as being common to a large percentage, and the final resulting average specification should comprise a very substantial and commonsense mount.

"PLEASURE MOTORING" AGAIN

A gathering at Stonebridge Hotel, near Birmingham, of members of the Motor Cycle Fuel Union. The run took place on Armistice Day to celebrate the historic event

SIDECARS IN THE SERVICES.

IN reviewing the great work of petrol vehicles in the war, the average person—be he a motor cyclist—fails to appreciate the part played by the sidecar machine. No doubt it will surprise the majority of readers to know that many thousand sidecars have been used on war service by the Allies and the U.S.A. In addition to the sidecar machine guns and ambulances used on the Western Front, sidecars have been used behind the lines by all the armies of the Entente.

In every town connected with the production of aircraft there are dozens of machines employed upon important messenger work, while many factories engaged upon Government work have found the sidecar invaluable for high speed light delivery.

Several sidecar manufacturers have been able to maintain and even exceed their pre-war output, and while a great quantity will have been destroyed or severely damaged, the war-worn machine proposition probably includes a certain number of sidecars.

Current Chat

Times to Light Lamps.

GREENWICH TIME.

Dec.	5th	... ...	4.22 p.m.
,,	7th	... ...	4.20 ,,
,,	9th	... ...	4.20 ,,
,,	11th	... ...	4.19 ,,

The D.R.'s Club.

On page 507 will be found particulars of the proposed D.R. club.

Prevention——!

A good way of dodging the 'flu is to take regular runs on a motor bicycle in the fresh air. May we draw the attention of the authorities to this?

Quality of Petrol.

Speaking at a Coventry meeting last Friday, Mr. E. S. Shrapnell-Smith, the Petrol Economy Officer, stated that better quality motor spirit could not be expected for several weeks owing to the enormous stocks of war spirit in this country.

Rally Sidecars.

This well-known line of sidecars will make its reappearance in a short time. The general programme is still undecided, but several new models will be available, incorporating many improvements. The Forward Works, Stoney Lane, Birmingham, also produced the Rally 2¾ h.p. two-stroke motor cycle in pre-war days; this is also to reappear, redesigned, and of a completely new specification, but details are not at present available. Disc covers for wheels are another speciality, and considerable work is being done in this line: the joints are now welded.

Future Trials.

An enterprising pressman suggests that he be "mounted" on a solo aeroplane to report the trials of 1919 and 1920. It would be useful for such places as Litton Slack.

Petrol Licences.

The number of motor cyclists to whom petrol licences have been issued since August, 1916, exceeds 197,000, of which over 45,000 are active at the present time. Those who have not exhausted their licence can now obtain petrol. We are advised that the total number of names of licence holders on file is a million.

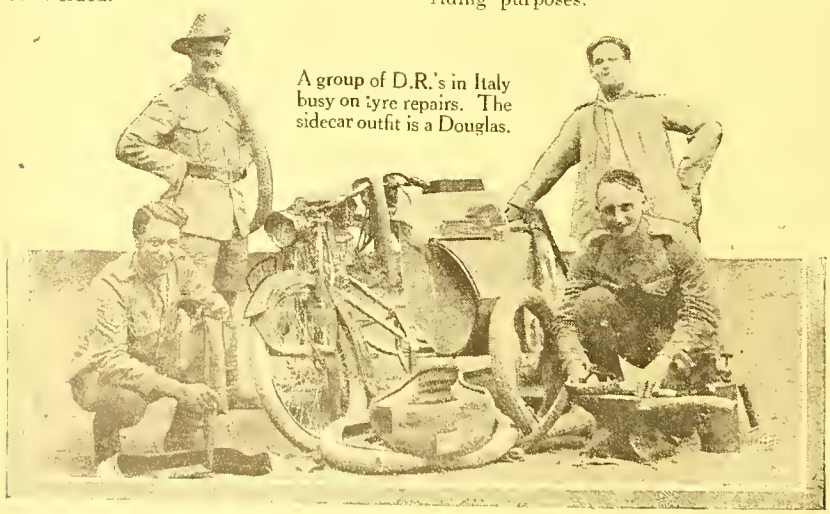
Unexpected but more than Welcome.

The opportunity has not frequently occurred for saying nice things about the Petrol Controller. The mere rareness of the opportunity makes it all the more welcome, and one is only too eager to make the best of it; hence this prominence to the experience of a correspondent who needed petrol.

His last licence had expired some months ago, and he had not troubled over a renewal. But on a recent Monday he came to the conclusion that his business requirements necessitated more fuel and circumstances justified his prompt application. Hence he wrote.

A week later to the day the demand note for payment of the tax and notifying the amount allotted—the same as that applied for—came to hand. The cheque was sent off the same day, and on the following evening the licence itself came to hand! Is this a record?

Perhaps a word of warning should be appended—the licence was not for joy-riding purposes.



A group of D.R.'s in Italy busy on tyre repairs. The sidecar outfit is a Douglas.

Special Features.

SHAFT DRIVE.
MOTOR CYCLISTS AND THE ELECTION.
CALL TO THE CLUBS.

Flat Twins.

Two new flat twins were described in *The Motor Cycle* last week. This week we refer to another, and we know of several more.

Petrol for Discharged Sailors and Soldiers.

The Auto Cycle Union is prepared to approach the Petrol Controller's Department with a view to procuring licences for discharged sailors and soldiers. The Union has already been successful in dealing with a good many cases, and, provided the regimental and registration numbers are given, discharged Service men who desire permits will in all probability get them. The address of the secretary of the Auto Cycle Union is 83, Pall Mall, London, S.W.1, and it is not necessary for a discharged man to be a member of the Union to avail himself of the services of the A.C.U.

The New Petrol Order.

We recently published in these pages the new petrol concession to the effect that motor spirit may be used for any purpose by licence-holders, or all owners of petrol bought under a motor spirit licence, within a radius of thirty miles. This concession has now been put into official language, and is entitled the Motor Spirit (Consolidation) and Gas Restriction Order, 1918: Amendment Order No. 2.

The only point in which the Order differs from what has already been published in *The Motor Cycle* is that the radius of thirty miles is taken from where the motor vehicle or motor boat is usually kept.

The Engine of the Future.

The flat twin engine certainly seems to be coming into its own. The latest development is its adoption by a well-known firm of large car manufacturers, who are turning to a friction-driven small car as their post-war speciality. The resemblance between this product—which at present exists only on paper—and the A.B.C. design is very striking indeed, except that the later machine is a trifle larger in everything but engine capacity. Even friction drive is used. And yet the two were worked out absolutely separately, and the car manufacturer knew nothing of the A.B.C. enterprise until he saw it announced in last week's issue of *The Motor Cycle*.

Death of an Irish Rider.

We regret to report the death from pneumonia of Mr. Tom Mallon, of Belfast. Mr. Mallon was an all-round sportsman, and before the war took an active interest in the Belfast M.C.C.

The Release of Carbide.

In an Order dated December 1st carbide may now be sold without a permit.

It is hoped that very shortly all restrictions on motoring will be completely removed.

It has been suggested to us that by March all impediments on the sale of petrol will be taken away.

Problems of Reconstruction.

Dr. Addison, the Minister of Reconstruction, has appointed, among many others, the following committee to advise him on the various problems which come before him having reference to the motor industry: H. C. B. Underdown, Esq. (chairman); B. Caillard, Esq. (B.L.I.C.); C. A. Hyde, Esq. (B.S.A.); E. M. S. Instone, Esq. (Daimler Co.); E. Powell, Esq. (Humber Co.); J. W. Stocks, Esq. (Components); L. Walton, Esq. (Vauxhall Motors); H. M. Wyatt, Esq. (A.B.M.A.M.); and G. M. Young, Esq. (Albion Motor Car Co.).

Several of these gentlemen are intimately connected with the production of motor cycles, and Mr. H. M. Wyatt will be remembered as a frequent contributor to the pages of this journal.

Auto Cycle Union Notes.

MEMBERS ROLLING IN.—Since the signing of the Armistice a considerable number of applications for membership has been received by the Union, and it would seem that in the first hours of the new era which has dawned motor cycling enthusiasts began to lay their plans for the enjoyment of peace conditions.

PETROL FOR DISCHARGED MEN.—The Auto Cycle Union has achieved extraordinary success in its endeavours to secure petrol for discharged members of H.M. Forces. The Petrol Control Department has expressed to the Union its willingness sympathetically to consider applications from discharged soldiers and sailors who want petrol licences for necessary purposes. Forms of application are available from the Auto Cycle Union, which is acting as a medium between applicants and the Control Department. On and from December 1st riding will be permitted within a radius of thirty miles of home, and applications at present can only be considered from men who have been discharged from the Army or Navy owing to wounds or sickness. Applicants for licences should write to the Secretary, Auto Cycle Union, 83, Pall Mall, London, S.W.1, and should enclose a stamped directed envelope for reply. The following particulars should be stated: (1) Name; (2) address; (3) rank and regimental number, and name of unit; (4) nature of wound or disability; (5) purpose for which petrol is required.

PREPARING FOR PEACE.—The A.C.U. is actively engaged in securing an early return to more normal conditions by making representations to the authorities for rescinding present existing restrictions.

A Wise Man.

He says: "The motor cycle is a great builder of good cheer; it drives away trouble, doubt, and gloom, and makes one glad to be alive, glad to hold up one's end, and glad to do one's greatest for the good of mankind."

Shortage of Emery Cloth.

Owing to the difficulty in obtaining sufficient supplies of emery cloth, it is essential, states an Army Council, that the greatest economy should be exercised by units and departments in its use. Whenever possible emery paper should be utilised in lieu of emery cloth.

Why they were Late.

Shortly after the capture of Courtrai the headquarters (we hear) found that despatch riders were being consistently late on schedule. The whole squad was paraded before the General to ascertain the reason for the delays. The excuse was that they had been captured in turn by the young women of the town and each had been soundly kissed. "They just insist," explained the D.R., "on stopping your motor cycle, and all want to kiss you at one time."

The Triumph Cycle Co., Ltd.

The report of the directors to be presented to the twenty-third ordinary general meeting of the Triumph Cycle Co., Ltd., states: The profit (including income from investments), after providing for repairs, depreciation, directors' fees, reserve for income tax, and transferring £35,000 to a War Contingent Reserve Fund, amounts to £60,048 19s. 2d. After adding the balance brought forward from August 31st, 1917 (£16,625 5s. 11d.), the amount available for distribution is £76,674 5s. 1d.

The directors recommend a dividend of 6½% per annum on the preference shares, 10% on the ordinary shares, and a bonus of 7½% on the latter, less income tax.

New Engine Unit.

Motor cycle engine manufacturers will be shortly augmented by the appearance of a new unit firm, who will introduce a flat twin engine.

Bowden Extension.

Messrs. Bowden Wire Co. have opened a works in New York in order to cope with the American demand for their famous products.

The Next Six Days' Trial.

The entries in the next big trials will be pre-war models modified, war models "civilianised," and real post-war models making their *début*.

The W.D. Machine.

Will the Government now decide upon a one model policy? If so, which machine will they choose? Obviously, if only one model is used it must be a dual purpose mount.

Peace, and what of the Future?

In sending in his "Which type" form, a reader, in referring to our article, "Peace and what of the Future?" writes: "An interesting article, expressive of a broad vision of the future."

Pluck—and a Samaritan.

A sidecarist last week gave a lift to a cripple who was valiantly struggling along a lonely highway. It transpired that he was a Mons hero, and could get no conveyance to take him to his destination seven miles away.

Reconstruction.

During the first three months of 1919 the Industrial Reconstruction Council will hold a series of conferences and discussions in the Hall of the Institute of Journalists. No tickets will be issued, but all those who intend to be present are asked to inform the secretary at 2 and 4, Tudor Street, E.C.4, who will furnish full particulars.

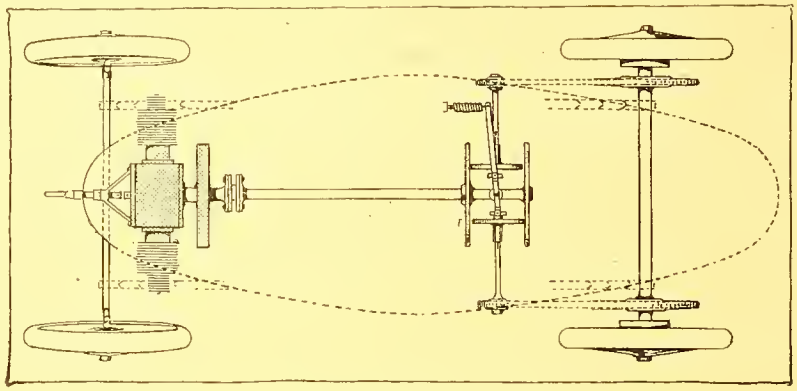
Lady motor cyclists attached to the A.S.C. making merry on Armistice Day. The lady in the background holding the Italian flag is driver to his Excellency the Italian Ambassador.

The A.B.C. 100 Guinea Cycle Car.

A Passenger Vehicle which promises to be both Light and Speedy.

AS announced in our last week's issue, the A.B.C. company will shortly market a hundred guinea cycle car fitted with a 1,200 c.c. air-cooled flat twin engine. We are now in a position to give in diagrammatic form a rough outline of the friction transmission system.

The engine will be mounted across the front of the chassis, which will be suspended on four quarter-elliptic springs. The cylinder heads will protrude on each side from a cowling which, we understand, will be reminiscent of a fuselage.



The A.B.C. cycle car transmission system in diagrammatic form.

The first stage of the transmission is by a shaft upon which are mounted two driving discs between which two driven friction wheels are located. These latter are on the inner ends of two countershafts, the final drive being taken by chain from the outer ends.

As will be seen from the drawing, each of the driven friction wheels is in contact with separate driving discs. When the former engage in the positions shown a forward drive is obtained, the ratio of which varies, according to the distance of the driven wheels from the centre of the drivers. The latter slide along their respective shafts, as is usual with friction gears.

When the wheels and discs are not in contact a free engine is obtained, and a reverse is provided by moving the left hand wheel to contact with the forward disc and the right hand wheel to the rear disc.

The clutch control lever supplies additional pressure between the wheels and discs as the lower gear positions are reached.

This arrangement was embodied in an American cycle car some time ago, and, we believe, was very successful.

It may be objected that the countershaft chain wheels will swing a shade out of line with the sprockets on the rear axle during the travel of the driven discs; but the clearance required between discs and wheels not in contact is very small compared with the length of the countershafts and the distance between the sprocket centres on either side. We therefore see no reason why this slight variation of alignment should prove objectionable in use. Undoubtedly this A.B.C. cycle car will have a strong appeal to the sporting driver.

A BRITISH HENDERSON FLAT TWIN.

Advance Particulars of a New Flat Twin of a Revolutionary Type.

THAT opposed twin engines will be a popular type in the future is made manifest every day. New designs are under experiment in every motor cycle manufacturing centre, and now Sheffield has added to the list.

The Sheffield contribution is to be marketed early in the new year by Messrs. Henderson Sidecars, who during the war have been engaged upon aero engine work, and some of the lessons will be passed on to motor cyclists in the form of a new type of flat twin engine with features of a revolutionary nature. We are not yet permitted to mention most of these, but it will interest readers to know that one of them is a method of forced induction.

The cubical capacity of the engine is 750 c.c., but, we are told, it develops considerably more power than the average engine of the size. Two other features of the design are the elimination of 25% of the usual working parts of an engine of this type, and the perfectly symmetrical design of the cylinders, which, of course, have detachable heads, providing an equal distribution of heat and so preventing distortion.

There is no timing case nor induction pipe; gas is admitted to the cylinders under a pressure of 30 lb. per square inch, while the lubrication is by forced feed through the bearings, the crank case being kept clear of the oil. Every part of the cylinder is interchangeable with the other, and this applies to valves, rods, bushes, cylinder heads, etc.

We hope at a later date to give more particulars of this interesting engine, which, we understand, has been on test for the past two years.

ALBION GEARS.

The gear products of the Albion Engineering Co., Birmingham, are now being hastened forward, but the transition from munitions to trade supplies of gears for private use will take some time. It is proposed to concentrate on a two-speed gear of an improved type; the number of models will be reduced to three and perhaps two. This firm hopes to supply the lightweight industry on a big scale in the coming year.

THE MOTOR CYCLE

AVIATION SECTION

The R.A.F. and Demobilisation. Civil Aerial Transport.

An Aeroplane Passenger Service.

That well-known motor cyclist, Cyril Patteson, now a major in the R.A.F., is attached to a large London aerodrome and is running an aeroplane passenger service, and has been engaged lately in taking over quite a number of important people to Paris.

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Aero Shows.

The International Aero Exhibitions which commenced in 1909 are to be resumed. The Society of Motor Manufacturers and Traders, Ltd., was responsible for these exhibitions, and it confidently anticipates that aero shows of the future will, unlike those of the past, prove a financial success.

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No Immediate R.A.F. Demobilisation.

The Air Ministry is anxious that it should be generally understood that the military situation does not admit of any officers or airmen being released from service from the R.A.F. except in a limited number of cases where particular individuals or classes are urgently required for reconstructing industrial conditions prior to demobilisation. The responsibility for dealing with all applications in the latter class rests with the Ministry of Labour, which will make a separate announcement as to the procedure.

Gratitude from the Air Council.

The Air Council have expressed their gratitude to all ranks of the Royal Air Force for their share in the long series of operations which have ended so triumphantly for British arms, and their admiration for the valour and devotion to duty which have been shown through all vicissitudes.

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Civil Aerial Transport.

In the report of the Civil Aero Transport Committee that has been presented to Parliament, the principal sub-committee recommends that "in any legislation there must be an assertion of the sovereignty and rightful jurisdiction of the Crown over the air superincumbent on all parts of His Majesty's dominions and the territorial waters adjacent thereto." They think that the ordinary three-mile limit for territorial water is insufficient for "territorial air." An early international conference on the subject of air traffic is recommended.

Another sub-committee discussed the conditions of commercial success from the scientific and technical standpoint, and recommends a speed of 100 m.p.h. where high speed railway competition has to be met, normal stages of 500 miles, improved facilities for night flying, and the development of land and air brakes.

Important conditions which should govern the choice of aerodrome sites are laid down. Opinion was divided on the subject of the part to be taken by the State in the development of commercial flying, but the principal sub-committee reported in favour of State encouragement and help of private enterprise as against an independent State Socialist experiment.

To Australia by Aeroplane.

The Aerial League of the British Empire, 46, Dover Street, London, W., is organising an air flight to Australia *viâ* India.

It has not yet been decided whether the flight will be competitive, though this will probably be arranged if suitable prizes can be offered for the winning pilots and the successful machines and engines.

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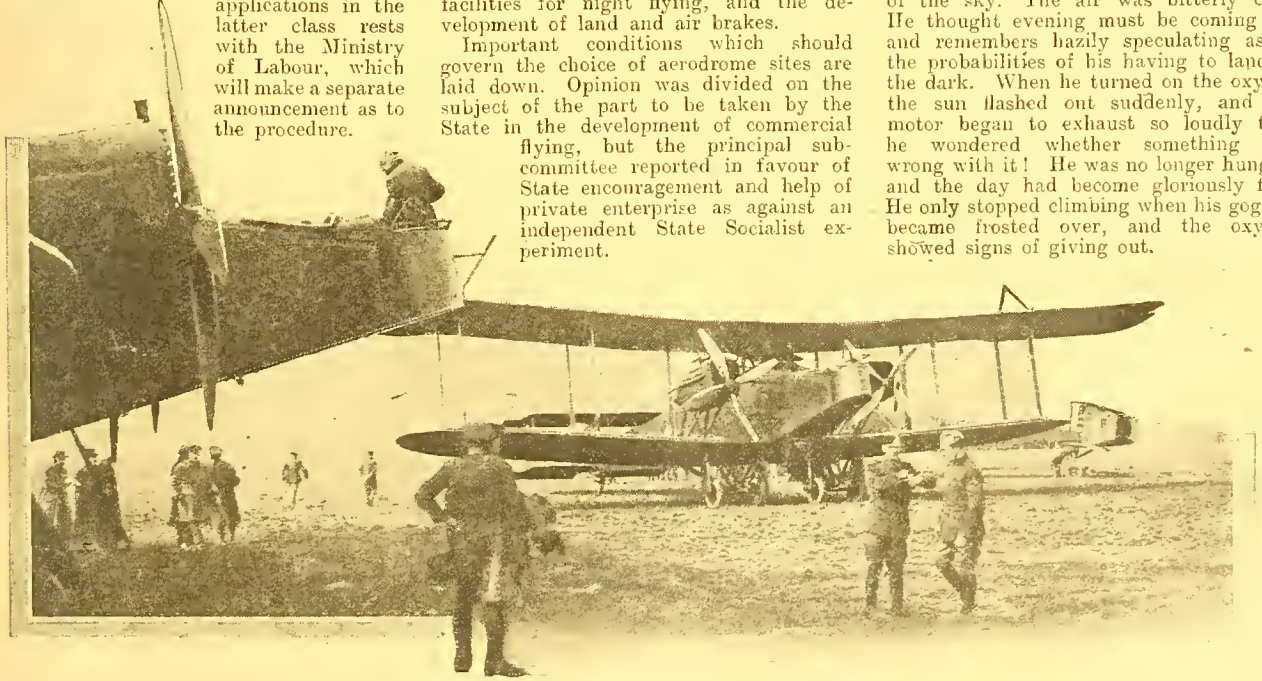
Making an Altitude Record.

Those who, tiring of Cæsar's "Gallic Wars," slid a copy of Jules Verne's more exciting "Voyage to the Moon" underneath, and devoured it, under the form-master's Argus eye, will be interested in the record altitude flight recently performed by Capt. R. W. Schroeder, of the United States Air Service. The captain set out with an oxygen apparatus calculated to last for six hours of flight, and succeeded in climbing to five and a half miles further than any pilot has ever ascended before.

At 26,000 feet, he says, he began to feel ravenously hungry. The air about him grew dim, and the sun looked like a wafer pasted against the pale blue of the sky. The air was bitterly cold. He thought evening must be coming on, and remembers hazily speculating as to the probabilities of his having to land in the dark. When he turned on the oxygen the sun flashed out suddenly, and his motor began to exhaust so loudly that he wondered whether something was wrong with it! He was no longer hungry, and the day had become gloriously fine. He only stopped climbing when his goggles became frosted over, and the oxygen showed signs of giving out.



Big bombing aeroplanes. Expressions of regret have been uttered by pilots at being frustrated in their desire to bomb Berlin. We have several planes that would have been capable of the performance.

TYPES OF AEROPLANE ENGINES.

Notes on Crankshaft Design, Order of Firing Cylinders, Magneto Speeds, Fuel Consumption, etc.

BROADLY speaking, there are two distinct types of aero engines, which, for the purpose of these notes, are classified as follows:

1. Rotary.
2. Stationary, which is further divided into three sections—radial, vertical, and V—all of which may be either water-cooled or air-cooled.

ENGINES OF THE ROTARY TYPE are more or less used for small fast scouting machines, because this type of engine has the lowest weight per h.p. The oil and fuel consumption of a rotary engine, however, is very heavy, which renders it impracticable for long-distance flying. One other point against the rotary engine is that it has to be taken down after about every forty hours' flying, whereas the stationary can be relied upon for at least 100 hours.

Rotary engines are complicated and require very careful handling. In the Royal Air Force a certain percentage of mechanics are trained to a great extent for this class of engine only, so that they may be thoroughly at home with any rotary engine that they may be called upon to look after. Highly skilled mechanics are essential where rotary engines are used.

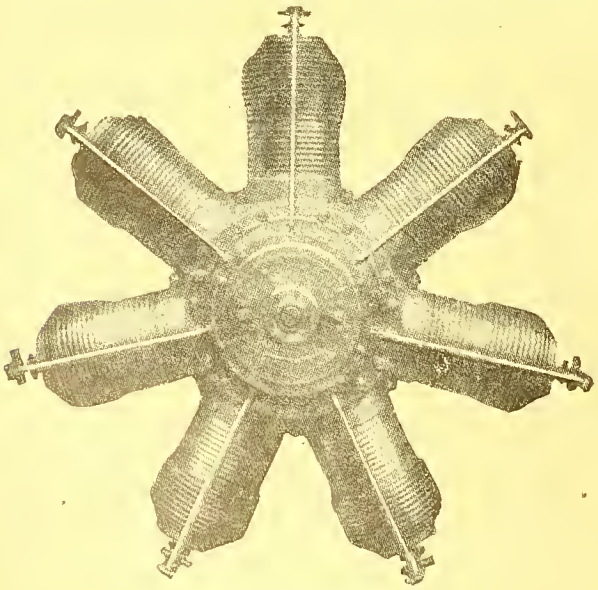
RADIAL ENGINES.—In this type of power unit the cylinders are placed around the crank case (which is fixed) in a star-like fashion. The advantage of this engine in comparison with other types of stationary engine is the low overall length. Radial engines are now entirely excluded from the flying services except in one or two isolated cases.

V ENGINES are a development of the vertical engine. By the introduction of the V system double the number of cylinders can be obtained with very little difference to the overall width of the engine. Vertical engines are usually built in varying h.p.'s up to 200 h.p., and the twelve-cylinder V engines up to 400 h.p.

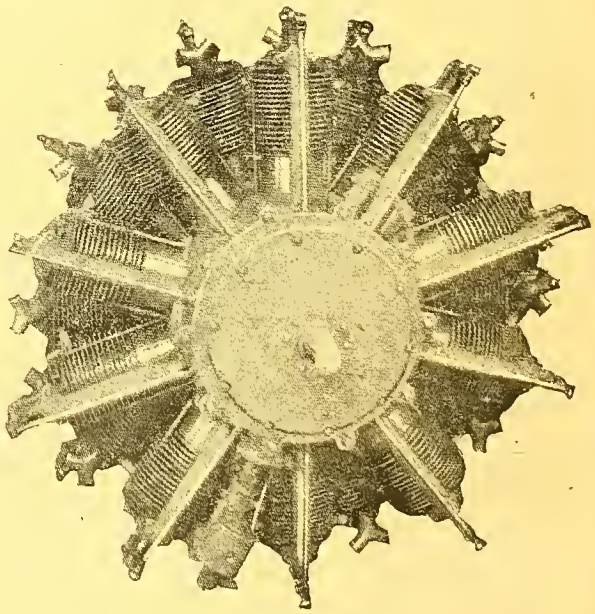
ENGINE LUBRICATION.—The lubrication of an aeroplane engine is a point the importance of which is very often under-estimated.

Stationary engines are lubricated by mineral oils—usually Vacuum "A" or Vacuum "B B"—but rotary engines require a vegetable oil such as castor oil. This is on account of the fact that castor oil does not mix freely with the petrol, of which there is always a quantity in the crank case of a rotary engine.

CASTOR OIL.—There are two kinds of castor oil in use—(1) pharmaceutical castor oil, and (2) treated castor oil, but for the purpose of this article both of these oils may be treated as alike.



The seven-cylinder Gnome.



200 h.p. Anzani radial engine.

Types of Aeroplane Engines.—

FUEL CONSUMPTION.—The average petrol consumption of a rotary aeroplane engine is 0.095 gallon per hour per h.p., and the consumption of oil is about 0.135 pint per hour per h.p. The oil consumption is, therefore, approximately eighteen per cent. of the petrol consumption.

DIRECTION OF ROTATION.—In practically all engines now used by the R.A.F. the direction of rotation is counter-clockwise, as seen from the propeller end. The propeller, of course, turns in the same direction as the crankshaft except in one or two engines which are fitted with speed reduction gears, in which case sometimes the propeller revolves in the opposite direction to the crankshaft.

MAGNETO SPEEDS.—The revolving armature type of magneto gives two sparks per revolution, therefore if used on a four-cylinder engine it must be driven at the same speed as the engine.

The revolving shield magneto gives four sparks per revolution, therefore would be suitable for an eight-cylinder engine if driven at the same speed as the engine.

Relation of Magneto Speed to Engine Speed.

In all other cases the magneto must be driven at a speed bearing a relation to the engine speed indicated by the following formula:

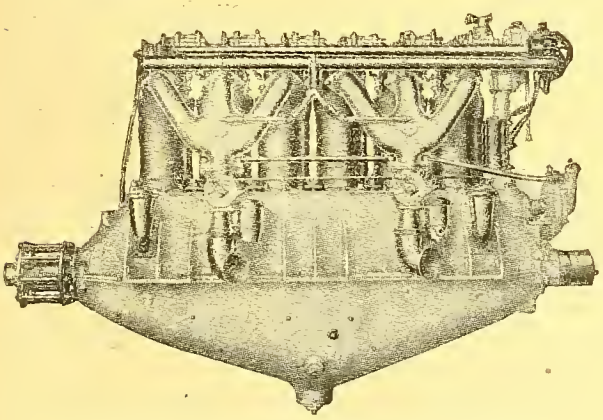
$$\text{R.P.M. of magneto} = \frac{\text{R.P.M. of engine} \times \text{No. of cyls. fired by mag.}}{2 \times \text{sparks per rev. of mag.}}$$

As an example, a six-cylinder engine with revolving armature type of magneto giving two sparks per revolution.

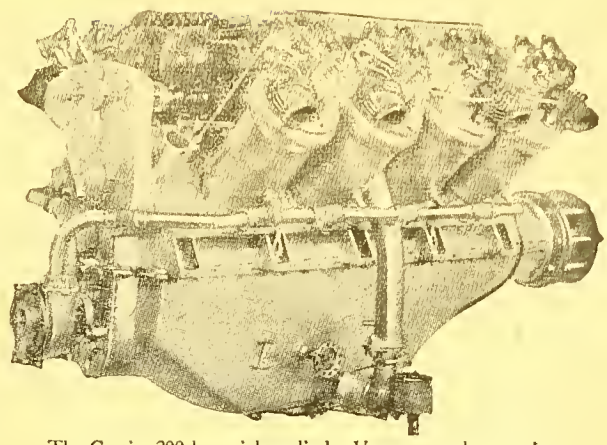
$$\text{R.P.M. of magneto} = \frac{\text{R.P.M. of engine} \times 6}{2 \times 2} = \text{r.p.m. of engine} \times \tfrac{3}{2}.$$

In this case, therefore, the magneto must be geared one and a half times the speed of the engine.

ORDER OF FIRING.—In aeroplane engines, where, for reasons of weight, a flywheel is undesirable, evenness of torque is a very big consideration; therefore the angle between which the crank moves between any two consecutive explosions must be the same. The angle is found by dividing the number of degrees moved through in one cycle (two revs) by the number of cylinders.



The Hall-Scott, an American vertical water-cooled engine.



The Curtiss 200 h.p. eight-cylinder V-type aeroplane engine.

Where 720° is the number of degrees in one cycle and n is the number of cylinders,

$\frac{720°}{n}$ = angle between any two consecutive impulses.

ROTARY ENGINES (ORDER OF FIRING IN).—In a nine-cylinder rotary engine the angle moved through between any two consecutive impulses is 80°. In such an engine the cylinders are placed at angles of 40°, so that every other cylinder fires in rotation, thus—

1 : 3 : 5 : 7 : 9 : 2 : 4 : 6 : 8.

No rotary engine has an even number of cylinders—an even turning movement could obviously not be arranged. There is one exception to the above, viz., the "double" or sometimes known as "twin" or "two-line" rotaries. These are really two engines joined together at the crank case.

STATIONARY ENGINES (ORDER OF FIRING IN).—Vertical aeroplane engines have usually six cylinders. V engines have 4 × 2, 6 × 2, or 6 × 3 cylinders.

Fig. 1 is a crankshaft for a four-cylinder vertical or a 4 × 2 V.

In order to obtain the correct balance, engines having four cylinders, or 4 × 2 cylinders, have four cranks arranged in pairs of 180°. Engines having six cylinders, 6 × 2 or 6 × 3 cylinders, have six cranks arranged in pairs at 120°.

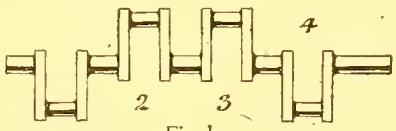


Fig. 1.

As the angle between the consecutive impulses of a four-cylinder engine should be 180°, the orders of firing may be as follows:

1 : 2 : 4 : 3, or 1 : 3 : 4 : 2.

In a 4 × 2 cylinder V the correct angle is $\frac{720°}{8} = 90°$.

The V angle of the engine is made to equal 90°, and the two sets of cylinders are treated as two separate four-cylinder engines firing alternatively

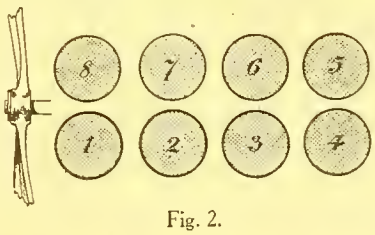


Fig. 2.

Types of Aeroplane Engines.—

at 180° intervals (see fig. 2). The order of firing in this illustration is—

1 : 5 : 3 : 7 : 4 : 8 : 2 : 6.

For crankshaft for a six-cylinder vertical engine, or a 6 × 2 or 6 × 3 V engine, see figs. 3 and 4 below.

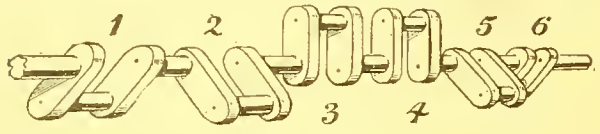


Fig. 3.

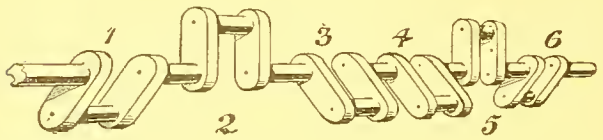


Fig. 4.

(Both are practicable, but the latter is in more general use.)

In a six-cylinder vertical engine the angle between each impulse is $\frac{720^\circ}{6} = 120^\circ$, and in fig. 4 the usual order of firing is—

1 : 5 : 3 : 6 : 2 : 4.

In fig. 3 the order of firing is usually

1 : 4 : 2 : 6 : 3 : 5.

In a 6 × 2 V engine the order of firing is $\frac{720^\circ}{12} = 60^\circ$, and is obtained by making the angle of the V equal to 60° and treating each set of cylinders as two

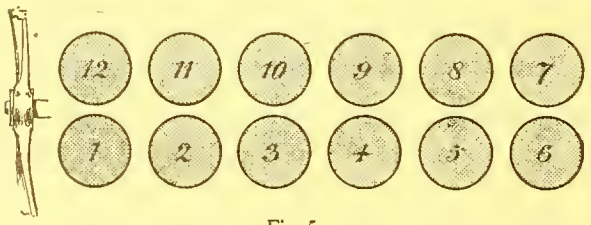


Fig. 5.

separate engines firing alternatively. With the cylinders numbered as in fig. 5 the order of firing is—

1 : 7 : 5 : 11 : 3 : 9 : 6 : 12 : 2 : 8 : 4 : 10.

With a fig. 4 crankshaft or with a fig. 3 crankshaft, as follows :

1 : 7 : 4 : 10 : 2 : 8 : 6 : 12 : 3 : 9 : 5 : 11.

In a 6 × 3 cylinder V engine the correct angle between the impulses is $\frac{720^\circ}{18} = 40^\circ$. (These engines are rather uncommon.) See fig. 6 for order of firing, which is as follows :

1 : 7 : 13 : 5 : 11 : 17 : 3 : 9 : 15 : 6 : 12 : 18 : 2 : 8 : 14 : 4 : 10 : 16

with a fig. 4 crankshaft or with a fig. 3 crankshaft the order is as follows :

1 : 7 : 13 : 4 : 10 : 16 : 2 : 8 : 14 : 6 : 12 : 18 : 3 : 9 : 15 : 5 : 11 : 17.

To those making a study of aircraft engines of the V type it is not suggested that the above figures should be memorised, but it is advisable thoroughly to master the following :

(1.) Various types of crankshafts in use in aero engines.

(2.) Corresponding orders of firing for four and six-cylinder engines.

(3.) The systems of numbering cylinders. It should be noted that some manufacturers have various numbering systems of their own, but the above are the simplest and are applicable to all the types of engines referred to above.

To find the order of firing for a V engine, (1) set out the order of firing for the corresponding vertical engine ; (2) fill in the numbers for the second row of cylinders in the correct order, which can be conveniently ascertained as follows : In the case of an eight - cylinder engine add 4 to each of the original numbers, and put the new figure down on the right of the original. In the case of a twelve-

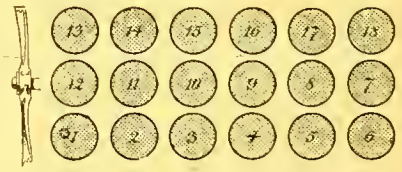


Fig. 6.

cylinder engine, add 6 instead of 4. In the case of an eighteen-cylinder engine (6 × 3, V or "fan"), the third row is found by adding 6 to those of the second row and putting the new figures down on the right of the second numbers, as before.

Example.—A twelve-cylinder V engine (crankshaft as in fig. No. 3). The corresponding vertical engine has six cylinders, and the order of firing is 1 : 4 : 2 : 6 : 3 : 5 ; add 6 to each, and we get :

1/7 : 4/10 : 2/8 : 6/12 : 3/9 : 5/11.

G. H. BETTINSON.

THE AIR AGE.

MR. J. A. WHITEHEAD, speaking at Queen's Hall, London, said that the wonders of to-day in the air would be naught as compared with the wonders of to-morrow.

We should set out to establish aerial posts, an aerial passenger line, a taxiplane service for the United Kingdom, a commercial air service, the development by means of aircraft of distant and undeveloped parts of the world, and international co-operation for the development of commercial aircraft.

It would be impossible for many years to come to build enough aeroplanes for all the people who would want to fly. Flying was absolutely safe. No machine would be allowed to be used in the service of the public until it had been registered in much the same way as ships are at Lloyds. Experienced captains were forthcoming, and the rising generation would take to the air as a highly skilled and lucrative profession.

The Atlantic flight is no longer a problem. It will be flown by an aviator in a Whitehead aeroplane in the early spring. He was quite sure that before a year or two we should see the crossing made as easily and as simply as from London to Paris.

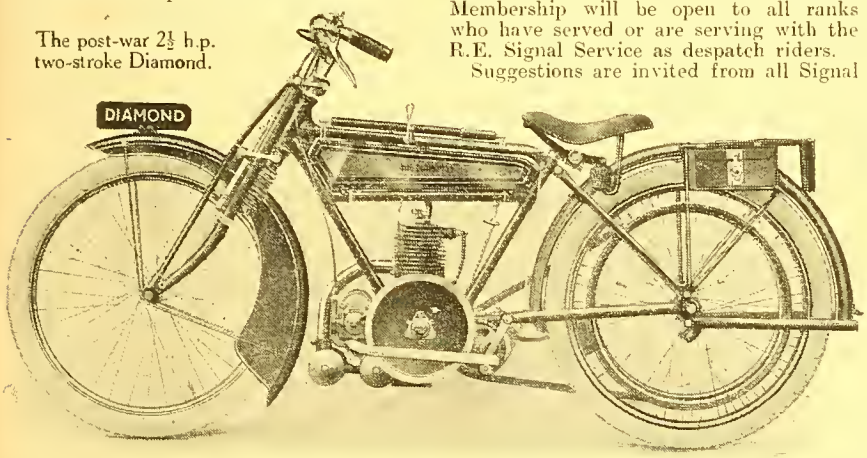
The use of the aeroplane in the development of the world's resources is a matter not alone for the suburban speculator, but for the Government.

THE PEACE MODEL DIAMOND.

THE D.F. and M. Co., of Wolverhampton, has decided to commence immediately the manufacture of three lightweight models on standard lines. These will be a 2½ h.p. Villiers-engined single-speed model, a similar machine with two-speed countershaft gear, and a 2½ h.p. four-stroke with engine two-speed gear.

All models have particularly pleasing lines with a compact dropped frame, the wheelbase being 50in. and 4½in. ground clearance. The weight of the two-stroke two-speed model is 120 lb.

The post-war 2½ h.p. two-stroke Diamond.



THE DESPATCH RIDERS' CLUB.

THE greatest possible interest is being taken by the several thousand despatch riders now with the British Army concerning the formation of the new D.R.'s Club. To carry on the preliminary work a provisional committee has been elected to serve until as many as are serving elsewhere can meet at a place and time to be decided upon as soon as circumstances permit to elect a fully representative committee.

The sporting element will be a predominating feature of the club, and the social side will not be overlooked. Membership will be open to all ranks who have served or are serving with the R.E. Signal Service as despatch riders.

Suggestions are invited from all Signal Service despatch riders, past and present, of the British Army. Officers or N.C.O.'s in charge of despatch riders would greatly facilitate the work of the organisers if they were to send to the hon. secretary *pro tem.* lists of men who would be willing to support the movement by becoming members.

The suggested annual subscription is £1 1s. Letters should be addressed to the Hon. Sec., Provisional Committee Signal Service Despatch Riders' Club, R.E. Depot, Wellingborough.

NATIONAL MOTOR CYCLISTS' FUEL UNION.

AT a well attended meeting of the N.M.C.F.U. in Coventry last Friday Mr. A. W. Torkington announced that it was intended to broaden the basis of the Union by throwing it open to all industrial motor cyclists, so that every man and woman worker who owns a motor cycle could become a member.

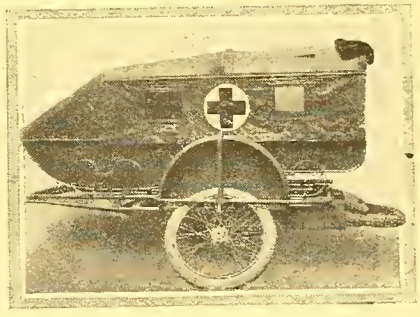
In its new scope there is every promise that the membership, already very large, will quickly expand to the 10,000 mark.

Mr. E. S. Shrapnell-Smith, the petrol economy officer, addressed the meeting, and referred to the importance of the fuel question. He said good work had been done in the cause of industrial alcohol production by *The Autocar* and *The Motor Cycle*, and gave interesting details of the results obtained by the use of a mixture of benzole and alcohol.

Mr. Torkington said he had every hope that after January 1st next members would get four gallons per month.

THE CAMPION SIDECAR AMBULANCE.

DURING the past week we called on Messrs. the Campion Cycle Co., Ltd., Robin Hood Street, Nottingham, and found them busily engaged on aeroplane construction. This, however, has not prevented them giving a thought to their "Peace policy," so that, although they will be busy for several months on current contracts, there is every possibility of an early start on the production of motor cycles. They have decided to put three models on the market—a lightweight two-stroke with Villiers engine, a 4 h.p. single and an 8 h.p. 90° twin, the last two named with J.A.P. engines. Mr. Campion is responsible for a neatly-designed spring frame, details of which we hope to publish later, together with a novel system of unit construction applied to the cycle and sidecar frames. This last, too, is of great interest as a distinct departure from the orthodox detachable sidecar chassis and in the provision of special springing and a new system of drive. Messrs. Campion will still make the 8 h.p. sidecar ambulance to supply collieries and various municipal bodies. All models, except the lightweight, will have chain drive, three-speed Sturmey-Archer gear boxes, and 28×3in. wheels.



A two-stretcher sidecar ambulance made by Messrs. Campion, with special springing and detachable wheel.

MOTOR CYCLE CLUB NEWS

IT is proposed to reform the Public Schools M.C.C., that once active little club, during the coming year. Few clubs have sent so many members to serve their country. One of the few now in England is Lt. Herbert Browning, R.G.A., A.A. Gun Station, Virginia Water, Surrey, who would be pleased to hear from present members, those eligible for new membership, and public schoolboys actually at school in possession of motor cycles who would care to join the club.

Motor cyclists in the Cheshire district who are interested in the formation of a motor cycle club should write to Mr. W. Eadington, London Road, Alderley Edge, Cheshire.

So far as the Metropolis is concerned, we have received a communication from Mr. S. P. Brown, The Laurels, 25, Ormiston Road, Shepherd's Bush, W.12, who has original ideas regarding the formation of a motor cycling club in his district. His aim is to make the club the biggest of its kind and develop the social as well as the sporting element. Mr. Brown's intention is to form a programme possessing many novel features. Those interested should get into communication with him.

The Secretary of the Auto Cycle Union, 83, Pall Mall, London, S.W.1, will always be pleased to assist motor cyclists in the formation of clubs, and is willing to give them help.

THE W.D. TRIUMPH.

We are advised that the 1919 price for this model to the public will be £85.

HENDERSON SIDECARS.

DURING the war Messrs. Henderson Sidecars, of Sheffield, have been engaged on aero work, and deliveries in quantities will be uncertain for a few months. The post-war range includes their featherweight model A, with coach-built body and side door; the model B1, which has been improved in minor details, also will be reintroduced.

An entirely new chassis has been designed and carefully tested, upon which will be mounted a luxurious body with commodious luggage accommodation.

A special model to suit the Indian, A.B.C., and other "spring frames" is included.

Great efforts have been made to eliminate all chassis rattle, and joints and knuckles have a patent adjusting device, and the mudguards are integral with the sidecar body.

Push pins and bolts will be manufactured from a new kind of rustless steel, which will brighten but will not rust. The makers' address is Aero Works, Fitzwilliam Street, Sheffield.

A CALL TO THE CLUBS AND OTHERS.

An Open Letter from the Secretary of the Auto Cycle Union.

JUST four and a quarter years ago there came a call to British motor cyclists, to which they nobly responded—at first in their hundreds and later by thousands. Of all the technical branches of our then little Army that which had taken the employment of motor cyclists in war under its care was not the least ready. Thanks to the foresight of a handful of enthusiasts to whom was due the formation of a War Office Advisory Committee on motor cyclists in, I think, 1911, many debatable matters, such as type of machine, nature of equipment, rapid mobilisation, etc., had been settled before war broke out. The one thing this Committee could not definitely forecast was the kind of response that would be made when the call came. But its confidence—both as to our men and as to their machines—has been justified many times over; in Sir John French's words, "no amount of difficulty or danger has ever checked the energy and ardour which have distinguished their Corps throughout the operations."

Are we equally ready for peace? And why the necessity for such readiness? What is to hinder us from picking up the threads that we so hastily dropped in 1914, resuming our week-end tours, our club runs and competitions, our daily use of the handiest vehicle man has yet invented? Alas! the obstacles are many and serious, and one indeed is insurmountable. Many have climbed their last hill during these four years of war, and their comradeship in the future can be but a memory; they would not have us grieve, but we would not forget. . . . And for the rest, are there not D.O.R.A. to be repealed, roads to be remade, petrol and other fuel made available, machines to be produced? Are there not grave portents of crippling taxation and shrunken incomes?

Yes, we must get busy betimes, ready to fight for peace, to force the hands of red-taped officialdom, and to drive home the fact that to hinder transport—be it motor lorry or motor bicycle—is mere national suicide.

More than two hundred clubs supported the Auto Cycle Union in 1914; to-day I doubt whether a dozen could get a committee together. But the boys will soon be returning, and already count on spending their 1919 holiday awheel, and not in Flanders. Surely in nearly every club one or two must be already at home who could fan the embers and get the club fire burning! Let every reader scan the list that follows, and see if his own locality is represented. If it is, let him rout out the secretary or the chairman and make him return to his old love, and, as our cousins say, "get goin'."

Our individual members have stood by the Union nobly. Many a touring member who has not crossed a saddle at home since early in 1915 has regularly sent his subscription from Overseas. Many have written in appreciation of the national services that the Union has been rendering; many have realised that on the outbreak of peace it will be all-important that the one organisation devoted solely to their interests shall be ready. But the great majority of our clubs have necessarily succumbed under the stress of war. In almost every case I believe they can be revived and made more successful than ever. Soon we shall have a reconstructed Government. Its hands will be so full that much of its work will necessarily be delegated to sub-committees. All sorts of questions affecting motorists and motor cyclists will be ripe for discussion and settlement.

What of yourself, reader? Are you a "clubman" past or prospective? Or do you prefer to "ride the farthest who rides alone"? Whichever it is, may I suggest that your duty to-day is clear? Do not be satisfied with a promise from your club officials that something will be done—offer to do that something yourself. Do not just send me your private subscription and forget all about it, but get every one of your motoring friends and acquaintances—including, of course, the ladies—to subscribe, too. And, all of you, make the fullest possible use of all the help we can give you—that is what the Union exists for. Write whenever you are in doubt or difficulty, write when any suggestion occurs to you as to how our influence may be increased, write at once when you hear of any threatened legislation, local byelaws, or trading restrictions which may affect your rights as a motor cyclist.

83, Pall Mall, S.W.1. T. W. LOUGHBOROUGH.

LIST OF CLUBS, &c., AFFILIATED TO THE AUTO CYCLE UNION.

NATIONAL AND OVERSEAS ORGANISATIONS.

British Motor Cycle Racing Club.
Clarion Cycle Club Motor Cycle Section).
Motor Cycle Union of Ireland.
National Motor Cyclists' Fuel Union
Scottish Auto Cycle Union
Seesmee M.C. (National Customs and Excise Federation).
Ceylon M.C.C.
Kirkee M.C. (India).
Motor Union of Nyassaland.
Rangoon M.C.C.

COUNTY AND PROVINCIAL CLUBS.

Abercynon, Port Talbot & Dis. M.C.C.
Aberdare & Dis. M.C.C.
Albion Tandem M.C.C.
Aman Valley & Dis. M.C.C.
Anglesey Motor Union.
Ashbourne M.C.C.
Ashby & Dis. M.C.C.
Ashford & Dis. M.C.C.
Aspatria College M.C.C.
Banbury & Dis. M.C.C.
Barton-on-Humber & Dis M.C.C
Bath C.C. (Motor Cycle Sec.)
Bexley Heath & Dis. M.C.
Bideford & Dis. M.C.C.
Birmingham M.C.C.
Blandford & Dis. M.C.C.
Bolton & Dis. M.C.C.
Bournemouth & Dis. M.C.C.
Bradford M.C.C.
Brighton & Hove M.C.C.
Bristol M.C.C.
Bristol B. & M.C.C.
Bristol Sports Club (Motor Cycle Sec.)
Bristol Wanderers C.C.
Bristol Wheelers C.C.
Brookdale (Catford) M.C.C.
Burnley Victoria M.C.C.
Bury & Dis. M.C.C.
Bury & West Suffolk M.C.C.
Camberley M.C.C.
Cardiff M.C.
Cardiff & Dis. M.C.C.
Carmarthenshire & Dis. M.C. &C.C
Cambridgeshire M.C.C.
Cambridge University M.C.C.
Canterbury & Dis. M.C.C.
Carlyle (Chelsea) M.C.C.
Central Technical College M.C.C
Cheltenham M.C.C.
Chesterfield & Dis. M.C.C.
Chichester & Dis. M.C.C.
City and Guilds M.C.C.
Clapton & Dis. M.C.C.
Cliffe M.C.
Colchester & Dis. M.C.C.
Cornwall & Dis M.C.C.
Coventry & Warwickshire M.C.
Cumberland & County M.C.
Deal, Walmer & Dis. M.C.C.
Derby & Dis. M.C.C.
Derby & W. Staffordshire M.C.C.
Derby T.T. Club.
Doncaster & Dis. M.C.C.
Dorchester M.C.C.
Dudley & Dis. M.C.C.
Eastern Counties M.C.
East Essex M.C.C.
East Yorks. M.C.C.
Essex M.C.C.
Evesham M.C.
Exeter M.C.C.
Folkestone & Dis. M.C.C.
Furness & Dis. M.C.C.
Gloucester M.C.C.
Grimsby & Dis. M.C. & L.C.C.
Harrogate & Dis. M.C.C.
Hastings, St. Leonards & Dis. M.C.C.
Herefordshire M.C.C.
Hertfordshire M.C.C.
Herts. County A.C. (Motor Cycle Sec.)
Highbury & N. London M.C.C.
High Wycombe & Dis. M.C.C.
Ilkley & Dis. M.C.C.
Ipswich & Dis. M.C.C.
Isle of Thanet M.C.C.
Isle of Wight M.C.C.
Islington & Dis. M.C.C.
Kettering & Dis. M.C.C.
Kidderminster M.C.C.
Kingston-on-Thames M.C.C.
Leicester County M.C.C.
Leicester & Dis. M.C.C.
Lewes M.C.C.
Lincolnshire & Dis. M.C.C.
Liverpool A.C.
Liverpool Amateur M.C.C.
Liverpool North End M.C.
Liverpool Volunteer M.C.C.
Llanelly & Dis. M.C.C.
Luton & South Beds. M.C.C.
Malvern & Dis. M.C.C.
Mansfield & Dis. M.C.C.
Matlock & Dis. M.C.C.
Merionethshire M.C.C.
Mersey (Liverpool) M.C.C.
Merthyr M.C.
Mid Bucks. M.C.C.
Middlesbrough & Dis. M.C.C.
Middlesex M.C.C.
Mid Kent M.C.
Newmarket & Dis. M.C.C.
Newport (Mon.) & Dis. M.C.
Newport Pagnell & N. Bucks. M.C.
Newquay (Cornwall) & Dis. M.C.
Norfolk M.C.C.
Northallerton & Dis. M.C.C.
Northamptonshire M.C.C.
North Birmingham A.C.
North Derbyshire M.C.C.
North Devon M.C.C.
North-Eastern Automobile Association, comprising the—
Automobile Club of S. Shields.
Bishop Auckland, Darlington and Dis. M.C.
Durham & Dis. M.C.C.
Hartlepool M.C.
Newcastle & Dis. M.C.
South Shields & Dis. M.C.
Stockton & Dis. A.C.
Stockton & Dis. A.C.C.
Sunderland & Dis. A.C.
Sunderland & Dis. M.C.
Wansbeck M.C.
North Staffordshire M.C.
North-Western Automobile Assoc.
North-west London M.C.C.
Nottingham & Dis. M.C.C.
Oxford M.C.C.
Penrith & Dis. M.C.C.
Peterborough & Dis. M.C.C.
Plymouth & Dis. M.C.C.
Portsmouth & Dis. M.C.C.
Purley & Dis. M.C.C.
Reading & Dis. M.C.C.
Redditch & Dis. M.C.C.
Retford & Dis. M.C.C.
Richmond & Surbiton M.C.C.
Rochester, Chatham & Dis. M.C.C.
Royal Albert A.C.
Sandwich & Dis. M.C.C.
Scarborough Southcliffe M.C.C.
St. Helens & Dis. M.C.C.
Sheffield & Hallamshire M.C.C.
Shropshire M.C.C.
Skewen & Dis. M.C.C.
Slough M.C. & L.C.C.
South Birmingham M.C.C.
Southend-on-Sea & Dis. A.C.
Stockport & Dis. M.C.C.
Stratford-on-Avon & Dis. M.C.C.
Streatham & Dis. M.C.C.
Stroud & Dis. M.C.C.
Surrey M.C.C.
Sutton Coldfield & Mid Warwickshire A.C.
Taunton & Dis. M.C.C.
Tottenham & Dis. M.C.C.
Tredegar & Dis. M.C.
Troedyrhiw & Dis. M.C.C.
Tunbridge Wells & Dis. M.C.C.
Uxbridge C.C. (Motor Cycle Sec.)
Warrington & Dis. A.M.C.C.
Wath-on-Dearne M.C.C.
Walthamstow & Dis. M.C.C.
Welsh Auto & Aero Club.
Western District M.C.C.
Wellingborough, Rushden & Dis. M.C.
West Hants. M.C.C.
Westmoreland M.C.C.
Weymouth M.C.C.
Wimbledon M.C.C.
Winchester & Dis. M.C.C.
Wisbech & Dis. M.C.C.
Wolverhampton & Dis. M.C.C.
Wolverton & Dis. M.C.C.
Woolwich, Plumstead & Dis. M.C.C.
Worksop & Dis. M.C.C.
Wrexham & Dis. M.C.C.
Yeovil & Dis. M.C.C.
York & Dis. M.C.
Ystalyfera & Swansea Valley M.C.C.

LETTERS to the EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.
All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

CLEANING PLUGS.

Sir,—I am not aware if this is generally known to your readers, but I find that heating plugs to red heat before immersing in petrol is a very efficient method of cleaning them. No damage is done to the insulator if the red heat is kept away from it.

I have been a reader of your journal for five years, and have not yet seen this mentioned.

W. J. LONGSTAFF.

A SUGGESTED TRIAL.

Sir,—It strikes me that an interesting six days' trial could be organised on the following lines: Limit entries to three classes: (1.) New machines. (2.) Machines bought previously to August 4th, 1914. All to be entered and ridden by private owners, and not to be specially tuned at the works. This would give an excellent idea as to the wearing qualities of the machines. (3.) Machines released by Government from service for public use (if this is done), and this class to be subdivided—*(a)* Machines which have been used abroad. *(b)* Machines used on home service. Such machines to run in service trim in all respects—service gear ratios, etc. The course not to be a freak one, but just an ordinary good standard course with a few bad hills and some short stretches of heavy going.

M.S.
Bristol.

THREE SPEEDS OR FOUR SPEEDS?

Sir,—In your issue of October 24th I notice a letter signed "A." eulogising the four-speed gear, but ending in a criticism of the six-wheel variety which might tend to create a wrong impression. I have had the pleasure of testing Mr. Malkin's experimental gear, and can confidently state that the difficulty mentioned is non-existent and all the changes are exceptionally easy to make. Apart from having to move the lever through the gate, which occurs in any gate change, it is as easy to change from second to third speed as from first to second speed or third to top.

It is true that two different pairs of dog clutches have to be engaged simultaneously, but as one of these engagements is made with the pinions running entirely free it is practically unnoticeable.

GEORGE T. GIBSON.

THE COMING CYCLE CAR.

Sir,—Practically everyone who follows the cycle car movement will have read and appreciated Mr. E. A. Sissons's reply to my letter in your issue of November 7th, and as it may be that others have misunderstood the original letter, perhaps you will kindly make it known that I am not out to ridicule *originality* of design in any shape or form so long as the result is a sound job.

Mr. Sissons has told us of the excellent results that have been obtained from the form of construction adopted in the Gibbons cycle car, and I should like to be among the first to offer my congratulations, as I now do.

I would say that my remarks were directed at the very type of rubbish that Mr. Sissons himself decries, and although my criticisms of the aeroplane fuselage design of chassis came very near to a direct blow at the Gibbons design, this was quite unintentional, and probably Mr. Sissons will unhesitatingly admit that the majority of such designs are a hopeless tangle of junk.

The past has shown that a single type of cycle car must indeed be wonderful if it is to please everyone, and it seems that there is still room for a runabout of a design between that of Mr. Gibbons and the existing light car; in any case, the public always have and always will demand the testimonial of a successful six days' trial before giving their confidence to a product of this sort.

As to my personal acquaintance with the subject on which I am writing, the onus is on Mr. Sissons to prove his remarks.

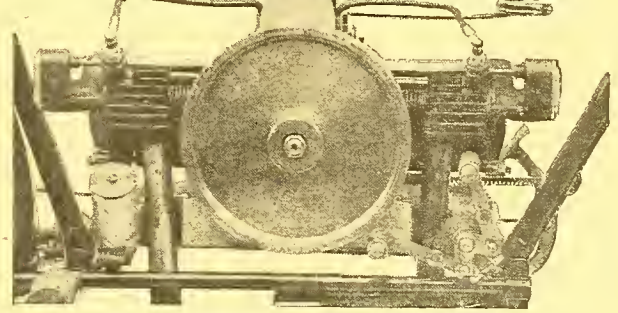
A. G. FENN.

LEAKAGE OF MAGNETISM.

Sir,—When I sent the first communication to you which you published under the heading of "Leakage of Magnetism," I sent it with a threefold object in view. First, to find out from readers of your valuable paper whether I was alone in my troubles with the Dixie magneto, or whether other motor cyclists were experiencing the same mysterious trouble, and, if they were, to give them the benefit of my "cure." Secondly, to hear, in reply, from some well-versed technical electrical correspondent a vindication or a condemnation of the theory which I was induced to bring forward at the instance of Mr. Hallas, motor engineer, Alloa, who first told me about the steel wheel draining the life-blood from the magneto. Thirdly, to challenge the Dixie people to say whether there is this defect or not in their magneto.

With regard to the first point, I think it has been proved from the letters in the correspondence that I have not been the only victim from that peculiar disease of "magneto tiredness," which disease, I am happy to say, I have had completely cured by a brass wheel, and my bicycle, a 4¼ h.p. 1916 B.S.A., can do its "all out" with a passenger and luggage in the sidecar as long as I like to let it. On the second point, Mr. J. P. J. Chapman's very lucid and clearly put letter in the issue for October 17th is conclusive enough proof, at least for me, considering the status of Mr. Chapman, that the magneto is working under a suicidal condition of things with a steel sprocket wheel, and that this being fundamentally wrong does not give the magneto or engine half a chance. And, lastly, on the third point, I think it rather strange, and a great surprise to me, that neither the Dixie nor the B.S.A. people have followed the precept of other people like Mr. Norton or Mr. Binks and replied to what was virtually a challenge to say "yea" or "nay," "brass" or "steel," and by so doing relieve many a hapless rider like myself of the necessity of paying pounds for breakdown and hotel expenses. Perhaps Mr. Chapman's letter will reach the eyes of the people concerned in this vital but little understood question, and induce them to let us know where the presumable error lies.

Kirkcaldy. WILLIAM ALEXANDER.



The power unit of the Wooler flat twin described last week.

PETROL FOR SAILORS.

Sir,—Thanks for your advocacy of petrol for Merchant Service officers and men on leave. It is only because people cannot appreciate the ghastliness of *carrying* it nowadays that at least "tanker" officers are not granted permits. A very fine tanker, the *Tuttasax*, left Port Said some time ago with 8,000 tons of petrol, was torpedoed forty miles out, was instantly in flames fore and aft, and not one life was saved. The sea, of course, was on fire, and attempts at rescue by escorts nearly involved them. This is but one of many unspeakable horrors. I carried petrol—7,000 tons each voyage—for 2½ years in the Mediterranean during the war, and when on leave last April I could not get a drop. My ship was torpedoed, but reached an Italian port. The foregoing details are ancient history, so harmless.

HOWARD ROBERTS (CAPT.).

BENZOLE.

Sir,—Although, according to the latest information in the daily press, there is a prospect of more petrol being released for private consumption in the near future, and a modification of the Petrol and Gas (Restriction) Order, 1918, appears to be imminent, no mention is made of home-produced motor fuels or petrol substitutes, such as benzole, etc., which are plentiful in this country and do not require shipping space.

It is an open secret that the output of benzole has been enormously increased during the war for the manufacture of explosives, and now that the demand for explosives is reduced, if not entirely eliminated, there is surely no reason why Government benzole cannot be released to the motoring public at a price far below the present fancy price of petrol, and without any restriction as to its sale or use.

The reason given by the Petrol Control Department for their inability to abolish totally the Restriction Order and to permit the unrestricted sale of petrol is that the demands of the Services are even greater now than before the armistice was concluded; but this cannot apply to benzole, which, as far as the writer's information goes, is not employed at all as a motor fuel.

The release of benzole at a reasonable price would do much to tide over the period of demobilisation, and at the same time would ensure that when the supply of petrol again becomes plentiful it will be obtainable at something like pre-war prices.

E. KENNETH HUNTER.

STEAM MOTOR CYCLES.

Sir,—Is not R. R. Bertram, who writes in *The Motor Cycle* of August 29th *re* "Steam Motor Cycles," a little bit "off" when he states that "a 2in. × 3in. steam engine (single-cylinder, I presume), backed by a head of 600 lb., would produce a performance equivalent to that of a 20 h.p. petrol engine"?

If this statement means anything at all, it certainly means that such an engine mounted on the chassis of a Ford car would be capable of propelling the said vehicle and five fully grown passengers up any hill to be found in this section of the world (Canada), and, believe me, there are a few tolerably fair ones within an hour's ride of where these lines are being written. I have in mind one hill in particular, about threequarters of a mile in length, upon which gradients of 1 in 6 and 1 in 5 are common, and the road surface is not exactly what would be termed a "boulevard" either! At one particular point the rise, for a short distance, is nearly 1 in 3; nevertheless, Ford touring cars, with full load, can negotiate it, but it makes their four-cylinder 20 h.p. engines rev. and snort "some" to do it! Possibly a Ford equipped with Mr. Bertram's 2 × 3 steam single could also go "over the top," but I have a mental picture of it trying to do the trick!

Mr. Bertram avers that steam cylinders 1¼in. × 1⅝in. will be found "ample for greatest needs in the motor cycle line," and clinches the matter, to his own satisfaction at least, by referring to certain "scale drawings" of a machine with precisely this size of cylinders, published some time ago in the *Model Engineer*. I have procured the requisite copies of this journal, and while I must thank Mr. Bertram for his willingness to give information, I am still unconvinced that a 2 × 3 single-cylinder steam engine could be successfully substituted for a 20 h.p. petrol engine, nor do I believe that even *two* single acting cylinders of 1½in. × 1¾in. bore and stroke (as per *Model Engineer* design) would yield sufficient power for even average motor cycle requirements. I do not know exactly what Mr. Bertram means by a "steam-driven velocipede," but I am quite certain that such an engine as he favours could not propel a modern heavyweight sidecar combination and hope successfully to compete with, say, a 7-9 h.p. Harley-Davidson or a M.A.G. engined Matchless. In a hill-climbing competition either one of these, I fear, would leave Mr. Bertram's steam 'bus standing.

In the early days of the motor car it is now a recognised fact that one of the chief faults which designers persisted in adhering to was under-powering. Let us profit by experience and not fall into the same error in developing the steam motor cycle.

While quite willing to admit the possibility of my 2 × 3 double-acting engine proving "a bit too large for its job," there is no question whatever in my mind *re* an engine of the capacity suggested by Mr. Bertram being altogether too small. I submit that both practice and experiment alike tend to bear out my contention, as witness the following:

Re practice. The oldest builders of steam cars in America find it expedient to equip their vehicles with twin engines of 4 × 5 bore and stroke. They are of the double-acting type, and work under a boiler pressure of 600 lb. per sq. in.

Now, American manufacturers are scarcely famous for the modesty of their claims, yet the rating of these steam cars, as shown by literature issued by the makers, is 20 h.p. only—not 60-75 h.p., as one would naturally expect according to Mr. Bertram's "formula." I think it is up to Mr. Bertram to explain this anomaly.

(Incidentally, I would direct attention to the fact that one 2 × 3 cylinder has, roughly, only about one-thirteenth the capacity possessed by a pair of cylinders 4 × 5.)

Re experiment. About a year ago there was described and illustrated in these pages a steam motor cycle driven by an engine of approximately the same capacity as that recently instanced by the writer. The machine in question was, I believe, built by a Mr. William Taylor. His engine had a bore and stroke of 2⅜ × 2½ inches, was double-acting, and the boiler carried a working pressure of 500 lb.; yet, nevertheless, the man who designed and built the machine tells us that the best road speed his 'bus was capable of was a trifle over 25 m.p.h.—a performance about on a par, not with "a 20 h.p. petrol engine," but with a Wall Auto-wheel!

Perhaps Mr. Bertram, or some other advocate of microscopic cylinders, will oblige with an explanation as to why Mr. Taylor's steam 'bus (seeing that it had the equivalent of a car engine) put up such a poor performance.

Lest the tone of the above tend to convey the impression that the writer is recanting his former conviction, I beg again to sign myself

STEAM (AND STILL STEAMING).

Mr. F. W. H. Newman, of Birmingham, on his 3½ h.p. 1913 Ariel. This old single-speed model has given its owner great satisfaction. Last August he ran from Birmingham to South Wales by the Wye Valley, carrying his wife and child, luggage, three tins of petrol, and spare tyres.

A D.R.'s CLUB.

Sir,—I should be glad to know your opinion, also the opinions of R.E. despatch riders, regarding the formation of a Royal Engineers' Despatch Riders' Club, with headquarters in London and branches at, say, Birmingham and Manchester, the idea being to meet bi-annually at one of the above towns for a dinner and chat, etc., with a merry evening.

If this inspiration meets with any favourable approval, can something be immediately done to form a club?

Comments from the Editor and old R.E. despatch riders will be gratefully accepted.

HENRY PRITCHARD, Cpl. R.E.

[We think the idea excellent, but reference to page 454, Nov. 21st, will show that a D.R.'s club has already been formed.—Ed.]

WAR PETROL AND KNOCKING.

Sir,—In your November 21st issue I see Mr. Gibbs's remarks on war time petrol (?) I entirely agree with him about it. My machine is a fairly new Imperial J.A.P. I should like to give a few comparisons between pre-war petrol and war spirit on my machine :

	Pre-war Petrol.		War Spirit.
1) Maximum speed	48 m.p.h.	..	30 m.p.h.
2) Carbon deposit	Hardly any.	..	A great deal.
3) Its effect on lubricating oil	No effect.	..	Liable to thin the oil.
4) Hill-climbing	Very good.	..	Knocks badly.
5) Cleanliness	Very clean.	..	Remarkably dirty.

It struck me that the war spirit I got hold of had been doped with paraffin. Has this been the experience of any of your readers? War spirit seems to be capable of making any engine knock in a surprisingly short time. I find the only way to stop knocking is to retard the ignition as much as possible.

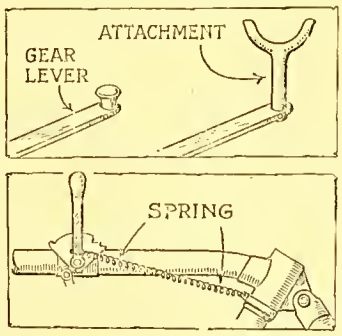
I sincerely hope that when peace has been properly settled up we may be able to get petrol, not war spirit. Benzole, too, seems to have quite a future as a motor fuel. R.N.

MOTOR CYCLING FOR THE MAIMED.

Sir,—If "One-armed Motor Cyclist" has an artificial arm, I suggest that he have a connection made to his Douglas gear lever as under. He can then depress the lever and move it to the desired notch with his false arm. A little experiment might be necessary to get the best position.

I have lost my left arm above the elbow, and have ridden numerous machines, sometimes using the artificial appliance, and at other times my foot or knee to work the hand gear controls. I managed to change on a 1913 T.T. Douglas on a forty-mile run recently without alteration.

I have ridden many miles on a machine fitted with a three-speed hub, the arrangement of which may be interesting. The control is the standard Sturmey-Archer quadrant, with a peg and spring inside the lever. My quadrant is worn, and the gear used to jump out from top to bottom, but by fitting a counteracting spring, as in rough sketch, I can change by means of my false arm with absolute ease. By fitting a spring of suitable tension I can shift the lever with my appliance from top without any fear of it passing second, and, by further pressure, it will go into low, and yet is easily pulled "up" when required. L. G. BROWN.



Suggested alterations to facilitate gear control.

THE THREE-JET BINKS CARBURETTER.

Sir,—Referring to Mr. Philpott's letter (November 21st) and his illustration of a hot air pipe, I would like to say that his design is one that I have been recommending for several years, and that it is very satisfactory, and also helps, as he says, to keep the back of the cylinder cool.

Now regarding his statements about the air holes in my carburetters not affecting the pilot jets, he is quite right in what he says to a certain extent. If you *entirely* close these holes up and make them *airtight* the mixture would then be much richer on the pilot jets; but it is intended to select such pilot jets that will give a correct mixture with the air holes slightly open. The spring clip does not cover the air holes up tightly enough to exclude *all* air, even when they are entirely covered up. What I mean to say is, supposing the air holes were half open when you were running on the pilot jets, it would not make any difference to the running if you were to open them fully. The main object of these air holes is to correct the mixture just when it is going on the main jet. If the mixture on this point is on the rich side the air holes should be uncovered more than they are, and this tends to weaken the mixture.

C. BINKS, LTD.

PETROL RESTRICTIONS.

Sir,—I find, on reading *The Motor Cycle*, that on and after December 1st, 1918, those who have petrol licences may use the petrol for "any purpose" within a thirty-mile radius, which means, I take it, "joy-riding."

Now why is this privilege granted only to those who have been favoured with licences? I think it most decidedly unjust to those who have not a licence to be debarred from the same privilege

Where do the members and ex-members of the forces and munition workers who have given of their best to the country come in?

If limited "joy-riding" is to be permitted, then let "all," and not "a favoured few," have the same privilege.

Then, again, how much petrol would motor cyclists use for "joy-riding" during the winter months?

One whose "joy-riding" of the last few months has been Widnes. SHANKS'S PONY.

Sir,—I am sure that many motor cyclists would be glad if you would use your weighty influence in securing from the Petrol Committee a temporary release of petrol for the Christmas holidays. Many of us would find a small allowance a great boon now railways are so congested, and we should have a chance of getting our machines into running condition for the good time coming.

The coming relaxations of the restrictions, as promised by the committee, indicate that only petrol licence holders will be enabled to use their machines for pleasure purposes.

By allowing us all a drop of joy spirit the Government would receive a substantial sum in the way of licence fees from those who have not already taken out this year's licences, and who would have to take them out for the few days before the New Year at half the twelve months' rate.

H.F.S.

Sir,—In your issue of November 21st I notice that petrol will soon be available—for certain lucky individuals.

As I understand the new Order, from December 1st licence-holders (who hold their licences on business grounds only) may use petrol for pleasure, while the unlucky individual like myself who surrendered his unused licence in August, 1917, has still to wait. This hardly seems quite like justice. The pill is not made any sweeter by the fact that personally my health has broken down under the strain of four years' war work. There are two questions I should like to ask :

(1.) I have two tins of petrol bought previously to August, 1917. Can I use this petrol within the thirty-mile radius from December 1st, although I hold no licence?

(2.) When petrol was stopped in 1917 it was several months before the Revenue tax was renewable. Will riders who ride for the first time this year in December have to pay the 10s. Revenue tax? C.W.D.

[The petrol may be used, but we cannot say what the Inland Revenue authorities will do about the tax.—Ed.]

BOOKS FOR MOTOR CYCLISTS

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or of leading Booksellers and Railway Bookstalls.

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Straying Cattle.

About 11.30 one night I was driving my motor cycle and side-car and collided with two beasts lying in the road unattended, which had strayed from a field near by, the gate being left wide open. My machine was damaged to the extent of about £10. Can I hold the owner of the cattle responsible for the damage? I have an independent witness of the damage, and he vouches for the ownership of the cattle.—A.A.

We fear that, owing to the extremely unsatisfactory state of the laws relating to straying cattle, you can obtain no compensation, though the police might summon the farmer and have him fined.

Accumulator Charging.

I have a four-volt 40 ampère hour accumulator, which I should like to keep charged to stop it from sulphating. I should like to do this at home. The circuit in my house is 230 volts direct current. The lamps used in the house are mostly 40 watt. (1.) What current does a 40 watt metal filament lamp pass? (2.) With a lamp resistance, how many lamps should I require to charge a 40 ampère hour accumulator (the charge rate is not stated)? (3.) What is an easy method of finding the consumption of various lamps when one has not an ampère-meter?—S.C.

(1.) The current taken by a 40 watt metal filament lamp on a 230 volt circuit may be taken as .2 ampère approximately. (2.) Ten such lamps would therefore pass a current of two ampères, which would be a satisfactory rate at which to charge your 40 ampère hour accumulator, though the time taken, about twenty-five hours, would perhaps be too long for you. A slow charge at a low rate is the best for the cell. You can, however, if you prefer, double this rate and halve the time. Carbon filament lamps are generally used for this purpose on account of the much larger current taken. On your circuit a 32 c.p. carbon filament lamp will pass .5 ampère. You can put the accumulator in series, with one complete lamp circuit in the house, or with the whole house supply. Very little diminution of the light will be observed, and the cell will then be charged at no extra cost beyond what you pay for house lighting. (3.) You may reckon that a metal filament lamp consumes one watt per candle-power and a carbon lamp four watts. Divide the number of watts by 230, and the result will be the current in ampères. The best means of putting the accumulator in the circuit is to atttach to each terminal of a switch (after determining the poles), and leave the switch in the "off" position. Do not forget to put the main switch off before attaching the accumulator wires.

Lost on Rail.

I would esteem it a favour if you would advise me on the following: Having a Douglas crankshaft which needed welding, I sent it to a certain firm, making a suitable box for crank and flywheel. I received the bill, and sent P.O. for the repair. I then received an old piece of canvas in return, with only flywheel attached, the crankshaft missing. On enquiring if this had been sent, I was informed it had been securely wrapped, and must have got lost on the railway, and endeavours would be made to trace the missing crank. I have had no further news since July 30th.—G.W.K.

We have submitted your query to our legal adviser, who replies as follows: "'G.W.K.'s' query whether he can make a claim on the repairer or the railway company depends on what arrangements were made as to the return of the crankshaft. It is rather difficult to believe that the crankshaft can have been securely packed; and if it were not, your correspondent could claim against the repairer in any event, but otherwise the claim would have to be made against the railway company, unless, as before stated, the arrangement made showed that the repairer was responsible for delivery in good condition to 'G.W.K.'s' address. In that case, he could sue the repairer, and the railway company would be brought in as a third party. I presume he has himself made full enquiries from the railway company. I should say it would be best for him to put the matter in the hands of a solicitor in his district."

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication, either during or after the war.

ILIFFE & SONS LTD

A Magneto Puzzle.

(1.) I have a Dixie magneto on my 2¾ h.p. Douglas. Being rather afraid to touch it before I get expert advice, would you be good enough to tell me if the spindle through the centre, on to which the magneto driving wheel fits, should be magnetised? I find that this is the case on examination. If this should not be so, would you tell me the fault and the best remedy? I only get a weak spark. I have tried unsuccessfully to start my engine after an overhaul. (2.) What jets have been found the best to use with a 2¾ h.p. Douglas on the Binks carburetter?—A.A.D.

(1.) The spindle in question should not be magnetised. It is possible, however, that it has become magnetised automatically. What we should recommend you to do is to send the magneto to the American Supplies Co., Ltd., 162, Great Portland Street, London, W.1. (2.) With regard to the best jet for a Binks carburetter fitted to a Douglas, those usually fitted are numbers .000, 1, and 7, but generally the right combination can only be found out by experiment.

RECOMMENDED ROUTES.

COVENTRY TO MORECAMBE.—H.B.B.

Coventry, Lichfield, Armitage, Rugeley, Stone, Pipe Gate, Nantwich, Middlewich, Northwich, Warrington, Newton, Wigan, Preston, Garstang, Lancaster, Morecambe.

MUSSELBURGH TO ILKLEY.—F.J.H.

Dalkeith, Stow, Galashiels, Selkirk, Hawick, Teviothead, Langholm, Longtown, Carlisle, Penrith, Kendal, Kirkby Lonsdale, Ingleton, Settle, Skipton, Ilkley.

GLOUCESTER TO REDDISH.—H.B.

Gloucester, Tewkesbury, Worcester, Kidderminster, Bridgnorth, Wellington, Hodnet, Whitchurch, Tarporley, Northwich, Altrincham, Stockport, Reddish. Approximately 135 miles.

ALTON TO TAVISTOCK.—F.L.

Alton, Alresford, Kingsworthy, Stockbridge, Salisbury, Wilton, Shaftesbury, Sherborne, Yeovil, Crewkerne, Chard, Honiton, Exeter, Crediton, Bow, Okehampton, Tavistock. Approximately 160 miles. The most direct route from Exeter is *viâ* Moretonhampstead and Two Bridges, but it entails the climbing of stiff hills.

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All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

☞ DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.B.C.

NEW Model A.B.C.'s; contract now settled; book for earliest deliveries.—Rider Troward and Co., 31, High St., Hampstead. [1242

Abingdon.

1913 Abingdon, 3½h.p., 3-speed, good mechanical order; £25, or offer. Wanted, 6h.p. twin.—Newall, Ongar. [1100

A.J.S.

A.J.S., 2-speed, £35; 4h.p. twin, £65; E.P. or exchange, 292, High Holborn, London. [6750

CROW Bros., Guildford.—A.J.S. Agents since 1912. Write us for your requirements. [9777

1913 A.J.S., 2½h.p., just overhauled, 2-speed, h.c. clutch, lamps, etc.; £20.—C. Marsh, Higher Pymore, Bridport. [X0469

1914 A.J.S., 6h.p., 3 speeds, clutch, kick starter, Lucas lamps; 48 gns.—Driscoll, 58, Woodfield Rd., Ealing, W.5. [1187

A.J.S. 6h.p. Combination, wind screen, hood, Lucas lamps (new), spare wheel, accessories; any trial; nearest offer £100.—Edmunds, Grocer, Bridgnorth. [X0429

NEW Model A.J.S.; contract now settled; let us add your name to waiting list for early delivery.—Rider Troward and Co., 31, High St., Hampstead. [1225

ADVICE.

IF you require a motor cycle or light car for use during the coming season, we advise you most strongly to **BUY NOW.**

YOU will save yourself at least 20 per cent., and get the pick of the market.

NEW machines are being rapidly booked up, and the makers will only be able to deliver in restricted numbers.

WE can offer earliest deliveries of

ROYAL ENFIELD	**ROVER**
MATCHLESS	**JAMES**
DOUGLAS	**MORGAN**
NORTON	**ZENITH**
LEVIS	**TRIUMPH**
CLYNO	**HENDERSON**
A.J.S.	**NEW IMPERIAL**
P. & M.	**HARLEY DAVIDSON**

SECOND-HANDS.

RUNABOUTS AND CARS.

MORGAN, 1916, G.P., M.A.G., all on .... —
MORGAN, 1914, G.P., 80 mm. tyres, dark blue .... —
MORGAN, 1918 G.P., M.A.G., brand new .. —
SWIFT, 1914, 7-9 h.p., lamps, being repainted £130
MORRIS - OXFORD, 10 h.p., Limousine Coupé, dyna. £325
MATHIS, 1914, 7 h.p., clover leaf 3-seater .. £175
BABY PEUGEOT, 1915, 6 h.p., 2-seater ... £150
HUMBERETTE, 1914, 8 h.p., water-cooled, as new £115
SUNBEAM, 1912, 12-16 h.p., 5-seater Lucas dynamo £385

SIDECAR COMBINATIONS.

HENDERSON, 1914 15, 2-sp., 4-cylinder many extras £90
NORTON, late 1916, 3-speed Combination . £80
HARLEY-DAVIDSON, 1917, Swan sporting Sidecar £128
HARLEY-DAVIDSON, 1917, 7-9 h.p., magneto model £128
ENFIELD 1914 6 h.p. Combination £60
ENFIELD, 1916, 8 h.p., 2-seater Sidecar .. £82
MATCHLESS, 1918, 8 h.p., standard war model £125
MATCHLESS 1912 8 h.p. Combination, fixed gear £23
SUNBEAM, 1914, 3½ h.p., all accessories .. £64
HUMBER, 1917, 8 h.p., flat twin, water-cooled £94
INDIAN, 1915, 7-9 h.p., just been overhauled £68
A.J.S., 1916, 6 h.p., 3 speeds, detachable wheels £100
P. & M., 1914, 3½ h.p., wicker Sidecar as new £62

SOLO MACHINES.

ENFIELD, 1912, 2¾ h.p., 2-speed, chain-drive £20
RUDGE 1914 Multi, 3½ h.p., requires repairs £25
DOUGLAS, 1913 (late), 2¾ h.p., 2-speed ... £32
DOUGLAS, 1914, 2¾ h.p., 2-speed, nice order £36
LEVIS 1915 2¾ h.p. Popular Model £22
ZENITH, 6 h.p., 1913, Gradua gear, and clutch £35
RUDGE, 3½ h.p., 1913, fixed gear very fast £20
CONNAUGHT, 1914, 2½ h.p., 2-stroke £18
NEW HUDSON, 1915, 2½ h.p. 2-stroke .. £20
DOUGLAS, 1915 2¾ h.p., 3-speed, and clutch £52
NEW HUDSON, 1914, 3½ h.p., 3-speed requires repairs £20
REGAL, 1914, 2 speeds all accessories ... —
ZENITH, 1914 4-5 h.p., twin, countershaft £47
P. & M. 1914, 3½ h.p., 2 speeds, kick-starter £48

Lists giving fuller particulars upon request.

MAUDES' MOTOR MART,
100, Great Portland Street, LONDON, W.1.
Telephone: 552 Mayfair.
Telegrams: "Abdicate, Wesdo, London."

IMPORTANT NOTICE.

Owing to the Christmae Holidaye, the Issue of "The Motor Cycle" for December 19th must be closed for press earlier than usual. All copy and instructions for Miscellaneous Advertisements in that issue must, therefore, be in our hands not later than first post on Thursday, December 12th.

MOTOR CYCLES FOR SALE.

A.J.S.

1915 A.J.S. Combination, requires overhauling and enamelling, engine, gears, clutch, tyres sound; best offer over £40.—Smith, 126, Market St., Tottington, Bury, Lancs. [X0465

A.J.S.—For the earliest possible deliveries of 1919 models, advance specifications and super service, try the A.J.S. Specialists, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0125

1917 6h.p. A.J.S., standard model, Lucas lamps, horn, special pistons with aluminium crown, spares, chain links, full tool roll, not done 2,000 miles; £80.—Box 2,503, c/o *The Motor Cycle*. [X0462

1916 A.J.S. 6h.p. Combination, spring seat-pillar, spare wheel, hood, wind screen, lamps, mechanical horn, speedometer, only done 4,000 miles, not been used for 12 months, plenty spares, absolutely new condition; bargain, £120.—5, Bexley Av., Roundhay Rd., Leeds. [1038

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9189

Alldays.

ALLON, 2¾h.p., 2-stroke, 2-speed, 1914, perfect; 2S gns.—232, Brixton Rd., S.W.9. [1211

ALLON, 2-speed, 1915, excellent condition, under 3,500 miles, accessories; bargain, £30.—Write, Sackett, 67, Cornhill, London. [1149

ALLON 1916 2-stroke, 2-speed, clutch, kick start, original tyres, lamps, etc.; a real peace bargain, £23.—Beswick, 1, West Heath Av., Golders Green, N.W.3. [1095

ALLDAYS Allon, new single speed, £38; ditto, 2-speed countershaft, £45; ditto, 2-speed countershaft, hand controlled clutch, £48; second-hand 2-speed, as new, £39/10; ditto, with lamps, horn, etc., £34; extended payments or exchange.—Service Co., 292, High Holborn, London. [8760

Antoine.

1913 Twin Antoine and coachbuilt sidecar, 3-speed Sturmey-Archer gear, new tyres throughout, waterproof Bosch mag.; a big bargain at £26.—Chandler, Reyre, and Williams, North Road Garage, Hitchin. [X0334

Ariel.

NEW Model Ariels; delivery coming shortly; let us add your name to our waiting list for early delivery.—Rider Troward and Co., 31, High St., Hampstead [1226

3½h.p. 1917 3-speed Ariel Combination, F.R.S. electric set, storm apron, luggage grid, unpunctured tyres, not used since Oct., 1917; £75.—32, North St., Bishop's Stortford. [1160

Bat.

BAT, 2¾h.p., less mag.; £4; stamp, photo.—Robinson, Sandy, Bedfordshire. [1192

BAT, 10h.p. twin J.A.P., overhead valves, special racing model, very fast and sporty, Bosch waterproof mag., B. and B. adjustable jet carburetter, P. and H. lamp set, Stewart mechanical horn, Lucas horn, with all accessories, every part in perfect condition; £52.—A.J.H., Anzanis, Scrubbs Lane, Willesden. [1046

Bradbury.

BRADBURY, 1914, 4½h.p., Canoelet sidecar, 2 speeds, hood, lamps, etc., guaranteed; £22.—51, Maplethorpe Rd., Thornton Heath. [1219

BRADBURY, free engine model, re-enamelled, new tyres, speedometer, lamps, etc.; £25; guaranteed good order.—Celtic Works, East Hill, Wandsworth, S.W. [1166

Brough.

BROUGH 1918, bought 1916, had little used, good condition; sell or exchange for Norton or Sunbeam.—Wm. Lord, 117, Blackburn St., Radcliffe. [X0482

B.S.A.

1919 B.S.A.—Early deliveries at Briggs, Motor Agent, Wellingborough. [X0120

B.S.A.—Several combinations in stock, 1914, 1916, and 1917.—Service Co., 292, High Holborn, London, W.C.1. [9655

MOTOR CYCLES FOR SALE.

B.S.A.

B.S.A. 4¼h.p. Motor Cycle for sale, 1916 model, all accessories, perfect condition, with sidecar attachment; £75.—Box L7,929, c/o *The Motor Cycle.* [1067

B.S.A.—For the earliest possible delivery of 1919 models, advance specifications and prices, sole district agents, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0126

NEW Model B.S.A.'s in stock, immediate delivery, chain-cum-belt; £81; early delivery all-chain models; book now; no permits.—Rider Troward and Co., 31, High St., Hampstead. [1227

1914 B.S.A. 3-speed All-chain Combination, best B.S.A. sidecar, 3 lamps, 3 generators, horn, new chains, tyres good, splendid running order, mileage about 7,000; £50, or nearest.—Renton, Surveyor, Excise, Kelso. [X0286

B.S.A. 3½h.p. 2-speed Combination, free engine, pedal start, all new tyres, new Pedley belt, 2 lamps and generator, in thorough mechanical order, Bosch watertight mag., B. and B. carburetter, torpedo body, upholstered in red; £28, no offers; seen any time.—119, Fentiman Rd., Vauxhall, S.W.8. [1108

Calthorpe.

CALTHORPE-J.A.P., Enfield 2-speed, nearly new; £25.—Dodd, 104, Plough Rd., Battersea, S.W. [1186

CALTHORPE 2½h.p. Lightweight, 2-speed, 1914 model, perfect; 16 gns.—7, Coldharbour Place, Camberwell, S.E. [1210

1917 Calthorpe Combination, 4h.p., 2 speeds, handle starter, electric lamps; 60 gns.—Driscoll, 58, Woodfield Rd., Ealing, W.5. [1188

1916 Calthorpe-Jap, 2¾h.p., mag., Enfield 2 speeds, runs splendidly; sacrifice 26 gns.—Jackson, 143, Ravensbury Rd., Earlsfield. [1089

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

CALTHORPE-J.A.P., 2¾h.p., 2-speed, 1915, with all fitments, perfect mechanical order, equal to new; £28.—Jones, 18, Bagillt St., Holywell, N. Wales. [X0430

NEW Model Calthorpes in stock; immediate delivery all models; no permits; 2¾h.p. 2-speed J.A.P., 45 gns.; 2-stroke, 2-speed, 40 gns.; ladies' 2-stroke, 2-speed, 43 gns.; 4-5h.p. twin combination, 76 gns.—Rider Troward and Co., 31, High St., Hampstead. [1228

Clyno.

CLYNO 6h.p. Coachbuilt Combination, 2 speeds, kick start, all chain drive, in splendid condition; £27.—Cougham, St. Mark's Rd., Highfields Estate, Maidenhead. [1043

Connaught.

CONNAUGHT Miniature, 2½h.p., 2-stroke, 2-speed, very good condition; £37/10; dittó, new single speed, £34; ditto, 2-speed countershaft, £41; E.P. or exchange.—Service Co., 292, High Holborn, London. [8741

Dalm.

DALM, 1916, 2¾h.p., hardly used; £20.—24, Beauval Rd., East Dulwich. [1130

Diamond.

NEW Model Diamonds; contract now settled; delivery approximately 6 weeks; let us add your name to our waiting list.—Rider Troward and Co., 31, High St., Hampstead. [1229

Douglas.

1915 Douglas, 2¾h.p., 2-speed; £42.—Below.

1916 Douglas, 2¾h.p., 2-speed; £48.—Elce and Co., 15-16, Bishopsgate Av., Cannomile St., E.C.3. [0551

DOUGLAS, in good order; £14.—Hall, 4, Cornwall Parade, Church End, Finchley, N.3. [1088

DOUGLAS Motors.—Earliest deliveries, all models. Book yours now.—Briggs, Motors, Wellingborough. [X0492

DOUGLAS.—Write us your requirements; either new machines or second-hand.—Moffat, Yeovil. Tel.: 50. [1103

DOUGLAS Motors.—Send your name for waiting list now to Gibb, Douglas Expert, Gloucester. 'Phone: 852. [4749

DOUGLAS, 1915, 3 speeds, lamps, knee-grips mud shields, new tyres, smart; £45.—24, Beauval Rd., East Dulwich. [1132

1913 2-speed Douglas, T.T. bars, excellent condition; £29.—Chandler, Reyre, and Williams, North Road Garage, Hitchin. [X0328

DOUGLAS, 1914, with spare valves, tools, etc., 2¾ h.p., 2-speed, good condition; £27/10.—Thomas, 377, Seaside, Eastbourne. [1181

DOUGLAS, 2¾h.p., 1916, 2-speed, free engine, very fast machine, been stored a year; £39.—Apply, Morgan, Croft Rd., Thame, Oxon. [1175

NICE Little 2¾h.p. Douglas, 1916, 3-speed, lamps, horn, excellent condition; £50; appointment to view.—Reffell, Novar, Earlswood Rd., Redhill. [X0420

DOUGLAS, 2-speed, 2¾h.p., disc wheels, long exhausts, re-enamelled and plated, in new condition, price £32, or best offer.—172, St. Ann's Rd., N.15. [1055

FOR STRAIGHT DEALS.

Telephone: MAYFAIR 7091 (2 lines).
Telegrams: "GOFRABIKE, WESDO, LONDON."

Godfrey's LTD.

208, GREAT PORTLAND ST., LONDON, W.1.

MOTOR CYCLES: New Models in Stock.

	3½ h.p. **ROVER,** T.T., with touring bars	£62	10
	3½ h.p. **ROVER,** T.T. model, with Philipson pulley	£67	10
	3½ h.p. **ROVER,** 3-sp. countershaft gear	£80	0
No. 6.	4¼ h.p. **JAMES,** single-cylinder, 3-speed, kick-starter	£79	0
No. 6.	4¼ h.p. **JAMES,** single-cylinder, 3-sp., kick-starter, with coach-built Sidecar and apron	£101	10
No. 7.	3½ h.p. **JAMES** Twin Solo Model, 3-speed, kick-starter	£79	0
No. 9.	5-6 h.p. **JAMES,** twin-cylinder, 28×3 tyres, countershaft 3-speed gear, chain drive, hand controlled clutch, kick-starter	£84	0
No. 9.	5-6 h.p. **JAMES,** twin-cylinder, 3-sp., kick-starter, with coach-built Sidecar and apron	£105	10
	8 h.p. War Model **MATCHLESS** Combination, J.A.P. engine, spring forks, countershaft 3-sp. gear, silent chain drive, patent quick detachable wheels, including spare wheel, 3in. tyres on all 4 wheels, kick-starter	—	
Model E.	2½ h.p. **LEVIS,** 2-stroke, 2-speed, Enfield gear	£47	10
Popular.	2½ h.p. **LEVIS,** 2-stroke	£32	0
No. 1.	2½ h.p. **LEVIS,** 2-str., single gear	£36	18
	2½ h.p. **LEVIS,** 2-stroke, 2-speed, with Edmund spring frame	£47	10
	2½ h.p. **LEVIS,** 2-stroke, 2-speed, Albion gear	£47	10
Model. H.	4¼ h.p. **B.S.A.,** 3-speed countershaft gear, chain drive	£81	18
Model K.	4¼ h.p. **B.S.A.,** 3-speed countershaft gear, chain-cum-belt drive	£79	16

Some Second-Hand Guaranteed Machines.

5745	£23	1911 3½ h.p. **RUDGE,** hand-operated clutch, belt drive, free engine, T.T. bars, footboards.
5768/9	£115	1918 8 h.p. **MATCHLESS** and Sidecar, War Model, J.A.P. engine, spring forks, countershaft 3-sp. gear, chain drive, detachable wheels (including spare wheel), lamps, and horn.
5764/5	£95	1917 3½ h.p. **ROVER,** 3-speed countershaft gear, chain-cum-belt drive, clutch, and kick-starter, with Rover coachbuilt Sidecar, lamps, generator, horn, and speedometer.
5606	£48	1915 Model B 5 h.p. **INDIAN,** twin cylinders, countershaft 3-speed gear, foot-operated clutch, chain drive.
1916		**CALTHORPE MINOR** 4-seater Torpedo, fitted with one-man hood, double folding screen, side curtains, cover for back seats, 5 Sankey wheels, 710×85 Palmer cord tyres, electric side and tail lamps, electric horn, speedometer, body painted grey, black wings, in perfect order throughout £259

Every Second-Hand Machine is thoroughly overhauled, before delivery, and replacements made where necessary.

All Second-hand Machines are supplied complete with Inflator, Tool bag, and Tools.

All Machines offered subject to being unsold on receipt of deposit.

Where accessories are not included, we are prepared to supply a brand new Lamp and Generator, also Horn, for the special price of **30/-.** Rear Light, complete with Y-piece and Tubing, **7/6.**

Full Specification of any Machine on request.

EXCHANGES. EASY TERMS.

MOTOR CYCLES FOR SALE.

Douglas.

DOUGLAS, 1915, 2¾h.p., 2-speed, complete lamps, generator, speed indicator, etc., stored at makers two years; £50.—74, Hornsey Lane, Highgate, N.6. [X0451

BEST Deliveries of 1918 Douglas models, also spares, by the man on the spot, Eli Clark, the pioneer agent, wholesale and retail, Cheltenham Rd., Bristol. [0966

DOUGLAS, 2¾h.p., 1915, 3-speed, excellent condition, new Amac carburetter fitted, supply of new spares; £45.—C. Johnson, 93, South Market Rd., Gt. Yarmouth. [X0285

DOUGLAS, 2¾h.p., 1913, 2-speed, Bosch mag., Binks carburetter, Watford speedometer, P. and H. lamp set; what offers? Seen by appointment.—Apply, Box L7,976, c/o *The Motor Cycle.* [1213

1915 Douglas, in splendid condition, fitted with Lucas lamps, Cowey speedometer, and horn; a genuine bargain at £42/10.—Chandler, Reyre, and Williams, North Road Garage, Hitchin. [X0327

DOUGLAS, 4h.p., with Millford underslung sidecar, 2-speed, kick starter, set of lamps, speedometer, watch, horn, two new Beldam tyres, exceptionally good turnout, in splendid condition; £50.—Morgan, Croft Rd., Thame, Oxon. [1176

DOUGLAS, 1914, K.S., semi T.T., new Amac, new Dunlops, speedometer, footboards, lamp, plenty spares, including 4 valves, chain, outer cover, etc., everything in good condition, speedy machine; great bargain, £36, no offers.—E., Bull Hotel, Pitsea, Essex. [1033

LATE 1915 2¾h.p. Douglas, 2-speed countershaft gear, engine in perfect condition. Dixie mag., Amac carburetter, P. and H. acetylene lighting set (new), Watford speedometer (new), horn, brass exhaust and cut-out, good Dunlop heavy tyres, general appearance excellent.—2nd Lt. Castle Smith, R.H.A., Sherwood, Brockenhurst, Hants. [1047

Elswick.

ELSWICK, 1914, 2-stroke Precision engine, perfect, spare belt; £18.—St. Elmo, Monkhams Lane, Woodford Green, Essex. [1172

Enfield.

ENFIELD, 1916, 3h.p., 2-speed, smart machine; £42.—41, Elm Rd., New Malden. [1177

1916 6h.p. Enfield Combination, complete, lamps, etc.; £72.—Cross, Effingham Sq., Rotherham. [X0472

ROYAL Enfield Lightweight, fine little puller; £15. —Brown, Rangemore Village, Burton-on-Trent. [X0516

ENFIELD, 3h.p., new 1915, condition almost as new, lamp, horn, new tyres; nearest £48.—Platt, Printer, Skipton, Yorks. [X0422

ENFIELD Combination, 1916 model, in excellent condition; accept £70 cash.—24, Grosvenor Av., East Sheen, S.W.14. [1170

ENFIELD.—For earliest deliveries new models, or renovating present machines, try Celtic Works, East Hill, Wandsworth, S.W. [1165

NEW Model Enfields; contract now settled; early delivery all models; book now.—Rider Troward and Co., 31, High St., Hampstead. [1230

2¾h.p. Twin Enfield, 2-speed and free, top-hole condition, complete with accessories; bargain, £20. —Perkins, Vyvyan Arms Hotel, Camborne. [X0405

LATE 1914 6h.p. Enfield Coachbuilt Combination, in first-class order, exhaust whistle, lamps; any test given and trial run.—20, Amberley Grove, East Croydon. [1062

1917 3h.p. Enfield Twin, 2-speed gear, kick start, footboards, in good running order, condition excellent; £36/10.—Robinson's Garage, Green St., Cambridge. [1143

ENFIELD Combination, 6h.p., 1914, complete with Lucas lamps and horn, speedometer, etc., splendid condition, tyres nearly new; £55.—H.L., 22, The Steyne, Worthing. [1050

ENFIELD Combination, 6h.p., late 1916, first-class condition, very fast and economical, new tyres, one spare cover and tube, complete with 3 lamps, tools, mat, and apron; any examination; £85.—C.B., 61, Station Rd., Harlesden, N.W.10. [X0185

Grandex.

GRANDEX-PUP, 1915, 2-speed, like new; £26.—Thomas, 24, Townley Rd., Dulwich. [1058

Harley-Davidson.

HARLEY-DAVIDSON 1916 Combination, 7-9h.p., electric model, Montgomery sidecar, splendid condition; £120.—Apply Box L7,930, c/o *The Motor Cycle.* [1068

HARLEY-DAVIDSONS; post-war contract settled long ago; orders booked in rotation for earliest delivery.—Rider Troward and Co., 31, High St., Hampstead. [1231

1917 Harley-Davidson, engine No. 1,983M., grey, Swan sidecar, hood, mileage 500, perfect condition, no lamps; 105 gns.—Driscoll, 58, Woodfield Rd., Ealing, W.5. [1189

Henderson.

HENDERSON 4-cyl. 2-speed Combination, lamps, horn, tools, splendid turnout; seen and tried weekends; £65.—Wells, 1, Station Av., Sandown, Isle of Wight. [1091

MOTOR CYCLES FOR SALE.

Humber.

3½h.p. Humber, 2-speed, free engine, handle starting; 16 gns.—Plastow, Grimsby. [1150

3½h.p. Humber, 2 speeds, complete; 25 gns.—Mustagh, 68, Doddington Grove, Kennington. [X0406

HUMBER Twin, 2¾h.p.; £20, or exchange with cash for cycle car.—39, Bulwer Rd., Leytonstone. [X0407

NEW Model Humbers; contract now settled; early delivery all models; book now.—Rider Troward and Co., 31, High St., Hampstead. [1233

HUMBER, 3½h.p., 2-speed, free engine, engine splendid condition, gear requires adjustment; bargain, £16, or offers.—Veebee, 1, Hilltop Rd., Oxford. [X0479

HUMBER Combination, 3½h.p., 2-speed, handle starting, Bosch, B. and B., speedometer, lamp and spares, good condition; £24.—Carter, Dover Rd. Walmer. [1191

1912 5½h.p. Humber, with or without coachbuilt sidecar, new condition; also 1913 3½h.p. Humber, in good condition, less brakes; what offers, or exchange for higher power combination, late A.J.S. or other good make.—G. Smith, Cross St., Kidderminster. [X0480

Indian.

7h.p. Indian, 1913, good condition, running order; £50.—Wright, 191, Greenstead Rd., Colchester. [X0433

INDIAN 1916 Powerplus, sporting sidecar, new condition, lamps, etc., etc.; £80.—51, Maplethorpe Rd., Thornton Heath, S.E. [1219

1915 Indian, 5-6h.p., 3-speed, kick start, front lamp, horn, and speedometer; £60.—F. Spackman, 1, Manchester Rd., Swindon. [1034

1915 7-9h.p. Indian, guaranteed thoroughly overhauled, runs equal new; £45; exchanges with pleasure.—Palmer's Garage, Tooting. [9203

INDIANS.—Post-war contract settled long ago; orders booked in rotation for earliest delivery.—Rider Troward and Co., 31, High St., Hampstead. [1232

1915 Indian 7-9h.p. Road Racer, clutch model, with coachbuilt sidecar, speedometer, lamps, and horn perfect condition; £50—8, Polygon Mews, Porchester Place, Edgware Rd., W.2. [1184

7-9h.p. Indian Motor Cycle, sidecar, 1915, for sale, a bargain, 3 speeds, full set lamps, electric and acetylene, first rate condition.—Apply, 67, George St., Portman Sq., London, W.1. [1066

1913 Spring Frame Indian, red, 2 speeds, clutch, kick start, disc wheels, Millford underslung double-seater sidecar, coachbuilt, with screen, good condition.—Catton, 337, King St., Hammersmith, London. [1052

INDIAN Combination, 1914, 7-9h.p., thoroughly overhauled, fine condition throughout, unused for 2 years, Phœnix torpedo sidecar, lamps and spares; any examination and trial allowed; £60; no dealers.—S., 41, Lichfield Rd., Stafford. [X0497

HENDEE Special 7-9h.p. Combination, 2 speeds, electric starting and lighting, Binks 3-jet damped carburetter, lever controls, splendid condition, only done 2 000 miles; £80, or nearest offer.—Belfield, Gaisley Cottages, Royston, Barnsley. [X0494

Ivy.

IVY 2¾h.p., 2-stroke, free engine, 2-speed gear, in going order.—Apply, Ross, 63, Church St., Inverness. [X0449

1916 Ivy 2-stroke, perfect order; £20.—Chandler, Reyre, and Williams, North Road Garage, Hitchin. [X0331

James.

1918 4½h.p. James Combination, for cash; £95; will take good lightweight in part exchange.—Box 2,485, c/o *The Motor Cycle*. [X0284

JAMES 1916 3½h.p. Twin, 3-speed countershaft, K.S. and clutch, P. and H. lamps, splendid condition; £45.—Bailey, 55, Erlingham Rd., Lee, S.E. [1048

NEW Model James.—4½h.p. combination, £99; 5-6 h.p. combination, £104; immediate delivery without permit; early delivery other models; order now.—Rider Troward and Co., 31, High St., Hampstead. [1234

Juno.

JUNO-VILLIERS, fixed gear model, 2¼h.p.; price £34 cash, or monthly payments.—Below.

JUNO-V.T.S., fixed gear model, 2¼h.p.; price £34 cash, or monthly payments.—Below.

4h.p. Juno-Jap, fitted with Sturmey-Archer 3-speed countershaft gear; price £63 cash, or monthly payments. Write for list.—Metropolitan Machinists' Co., Ltd., 248, Bishopsgate, London, E.C.2. [1070

NEW Model Junos.—4¼h.p. J.A.P., Sturmey 3-speed countershaft gear, hand clutch, kick-start, 72 gns.; Juno-Villiers, single speed, 2-stroke, 34 gns; no permits.—Rider Troward and Co., 31, High St., Hampstead. [1235

Levis.

1915 Levis, 2¾h.p., 2 speeds, in fine order; £27.—Cross, Jeweller, Rotherham. [X0474

LEVIS Popular, 2¼h.p., first-class order; £20.—Elce and Co., 15-16, Bishopsgate Av., Cannonile St., E.C.3. [0552

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LEVIS, 1917 model, new machine, slightly shopsoiled, 2½h.p., 2-speed gear; £45.—Hopkins, New St., Ledbury. [X7264

LEVIS, 2½h.p., 2-speed model, new August, 1918, and hardly used, Enk starter, lamps, unpunctured.—Sage, Minster Precincts, Peterborough. [X0421

LEVIS, 2¼h.p., 2-speed, Stewart speedometer, Pedley Grips, footboards, lamp set, brand new; £30.—Govandale, Erith Rd., Belvedere, Kent. [X0371

LEVIS.—For the earliest possible delivery of 1919 models, advance specifications of all models, sole district agents, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0127

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1913 Lincoln-Elk, 3½h.p., Bosch, B. and B., adjustable pulley, Cancelet sidecar; £25; would separate.—Rogers, 23, High St., Bromley, Kent. [1110

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MATCHLESS War Model Combination, with spare wheel and tyre; £140; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [9345

MATCHLESS.—Immediate delivery war model combination, spare wheel and tyre; £125; no permits.—Rider Troward and Co., 31, High St., Hampstead. [1236

1915 T.T. Matchless, 5-6h.p., new condition, only ridden 200 miles; 65 gns., bargain.—Mrs. Crop, 24, Hugh Oldham Drive, The Cliff, Higher Broughton, Manchester. [1041

MATCHLESS.—Special contracting agents for post-war Matchless models; earliest deliveries; exchanges and easy payments arranged.—Maudes', 100, Gt. Portland St., London, W.1. [9920

MATCHLESS Combination, late 1915, M.A.G. 8h.p., spring wheels, twin exhaust, complete lighting set, Low generator, many extras, fine condition; £90.—May, 47, Masons Hill, Bromley, Kent. 'Phone: 1321. [1224

New Hudson

NEW Hudson Combination, 3½-4h.p., 2-speed, F.E., handle start, Bosch (enclosed); £28/10.—Speedley, 1, Gunnersbury Lane, Acton Hill, London. [1158

NEW Hudson, 3½h.p., 1914, 3-speed, kick starter, came sidecar, lamps and horn, in splendid condition; £35.—Butterworth's Garage, 64, Mill Lane, Brixton Hill. [1152

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CROW Bros., Guildford.—New Imperial, all models, new and overhauled second-hands stocked. [9778

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1914 2¾h.p. New Imperial-Jap, 2 speeds, good order; £17/10.—Chandler, Reyre, and Williams, North Road Garage, Hitchin. [X0330

1917 New Imperial, 2¼h.p., as new, lamps, generator, horn; £30, bargain.—Smith, Charlton Villa, Staines Rd., Bedfont, Middlesex. [1093

NEW Imperial Motor Cycles.—2-speed, standard, and lady's models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0956

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NEW Model Nortons; post-war contract settled long ago; earliest delivery; book now.—Rider Troward and Co., 31, High St., Hampstead. [1238

NORTON, 1916, 3½h.p., T.T., 3-speed countershaft, accessories, splendid condition; £70, or exchange.—Hedger, Coulsdon, King Charles Rd., Surbiton. [1122

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3½h.p. 1908 N.S.U., in good condition, H.T. mag. fitted; £7.—Merryfield, Eythorne, Dover. [1054

O.K.

O.K.'s, new and second-hand, in stock from 20 gns.; extended payments or exchange.—Service Co., 292, High Holborn, London [8754

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O.K. Junior, 1916, Mark VI., M.A.G. engine, 2-speed countershaft gear, lamps, mechanical horn, etc., condition excellent; £29, or near offer.—Parnell, 21, Suffolk St., Pall Mall. 'Phone: 6644 Gerrard. [1042

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1911 P. and M., good order, £18; sidecar, £2; not used since 1915, except to overhaul.—Allsop, Knowle, Elstree. [X0400

P. and M., 1911, with detachable wicker sidecar, complete with all tools, 2 spare tyres, horn, and lamps; £52, or nearest offer.—Write F., 12, Boswell Rd., Thornton Heath. [1115

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PRECISION, 2¾h.p., guaranteed in good order; £15.—Ralph, Balmuir Mews, Sussex Sq., W.2. [1045

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PREMIER, 1913, 3½h.p., 3-speed Sturmey-Archer, good condition; £18.—Bailey, 55, Effingham Rd., Lee, S.E. [1049

PREMIER.—Several models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9657

PREMIER Combination, 3-speed, lamps and horn, excellent condition, fine appearance, laid up during war; bargain, £29/10.—4, Bentcliffe Lane, Leeds. [X0498

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QUADRANT, 1914 or 1915, 7-9h.p., overhead valves, beautiful coachbuilt sidecar, with luggage grid at back, 2-speed Enfield gear, handle starter, all-chain drive, lamp, horn, and tools, in splendid condition; £55.—Butterworth's Garage, 64, Mill Lane, Brixton Hill. [1151

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REX Combination, 6h.p., 2-speed, free engine, handle starting, good cane sidecar, good order; 29 gns.—Plastow, Grimsby. [1137

REX 6h.p. Powerful Twin Combination, 2-speed, F.E., handle starting; £28/10; lightweight wanted.—Speechley, 1, Gunnersbury Lane, Acton Hill, London. [1157

REX 6h.p. Twin, Canoelet sidecar, storm apron, 3-speed, hand clutch, kick start, Bosch mag., Advance pulley, Amac, Stewart horn, perfect order; seen by appointment; £29.—Hirst, 31, Barnehurst Av., Northumberland Heath, Erith. [1078

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1914 3-speed Rover Combination, in splendid condition, brand new extra heavy Dunlop on rear; a great bargain, £42/10.—Chandler, Reyre, and Williams, North Road Garage, Hitchin. [X0335

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1915 T.T. Rudge Multi, I.O.M., free engine and clutch, lamps, tyres, etc., perfect; £45.—Turner, Westbourne House, 95, Richmond Rd., Twickenham. [1040

3½h.p. Rudge, I.O.M. model, with adjustable pulley, late 1916, just completely overhauled and re-enamelled, Lucas horn, electric lights, black disc wheels, in perfect order, like new; £55, or offer.—Wilson, 45, Malden Rd., Kentish Town, N.W. [1057

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1915 3½h.p. Sunbeam and Watford sidecar; £75.—Bellingham, Ormes Lane, Tettenhall Wood, Wolverhampton. [X0448

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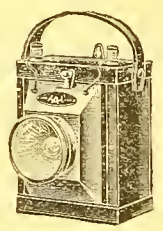

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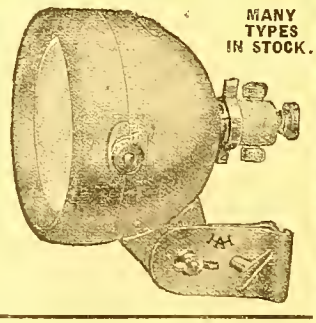

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1916 Sunbeam Combination, 8h.p. M.A.G., Lucas dynamo lighting, hood, screen, mud shields, splendid condition; £150.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0492

8h.p. Sunbeam Combination, magnificent outfit, run about 1,000 miles, all accessories and spare wheel, been stored the last 18 months.—Apply, Samuel Farmer and Co., Northampton Sq., Leicester. [1162

SUNBEAM, 3½h.p., late 1915 model, 3-speed counter-shaft, all-chain drive, head and tail lamps, in excellent running order; quick sale; owner going abroad; £55.—Box 2,506, c/o *The Motor Cycle.* [X0524

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1910 Triumph, in good order; £14.—Chandler, Reyre, and Williams, North Road Garage, Hitchin. [X0329

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TRIUMPH.—One countershaft and several older models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9103

3½h.p. 1915-16 Triumph Motor Cycle, 3-speed, fitted with sidecar, guaranteed in good order; £47.—Ralph and Co., Bathurst Mews, Sussex Sq., W.2. [1059

TRIUMPH, 1913, 3½h.p., 3-speed Sturmey-Archer gear, Bramble coachbuilt sidecar, lamps, horn, apron, spares, in excellent condition; price £50.—Frost, Bank House, Bromyard. [X0478

TRIUMPH, 3½h.p., 3-speed, new 1914, fully equipped, splendid condition, unused since 1915, with cane sidecar; bargain, £38.—Lieut. Bacon, 10, Stanley Rd., Bowes Park, London, N.11. [X0461

TRIUMPH, 1913, 3½h.p., 3-speed S.A., clutch, Montgomery sidecar, lamps, horn, tools, gear clutch overhauled by makers, new pistons, splendid condition, thoroughly sound; £35.—Avery, Matlock Bath, Derby. [X0471

TRIUMPH, late 1914, 3 speeds, Sturmey-Archer, brand new, Stewart speedometer, Bosch, just been thoroughly overhauled at a cost of £15, accept for quick sale £45; equal to new; or exchange lightweight and cash to value.—85, Revelstoke Rd., Southfields. [1194

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WOLF-J.A.P., believed 1916, 4h.p., brand new; £32.—24, Beauval Rd., East Dulwich. [1151

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ZENITH.—Several models in stock; E.P. or exchange.—Service Co., 292, High Holborn, London, W.C.1. [9104

ZENITH, 1917, 8-11h.p. twin, kick starter, clutch, etc., all in perfect condition, as new; £75.—Ralph, Bathurst Mews, Sussex Sq., W. [1044

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1914 5-6h.p. N.S.U. 2-speed Combination, watertight Bosch, overhead valves, wind screen, £40; 3½h.p. 1913 J.A.P. combination, 2-speed, £26; any inspection; take 2-stroke part exchange.—194, Baker St., Enfield. [1146

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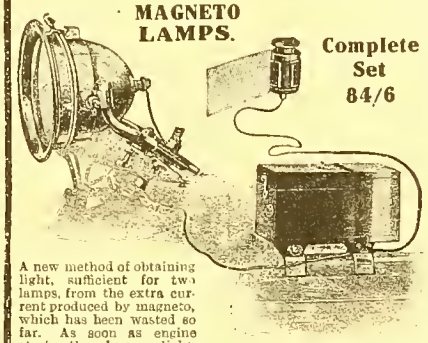

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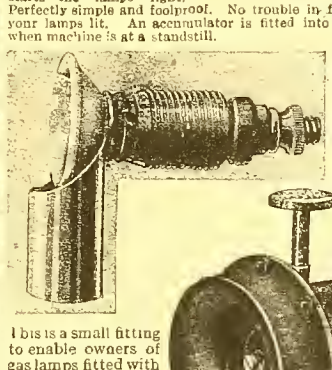

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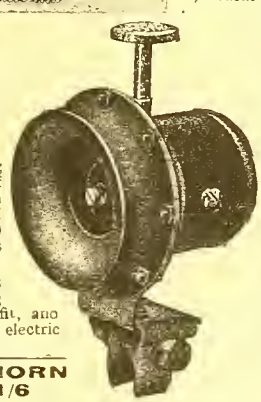
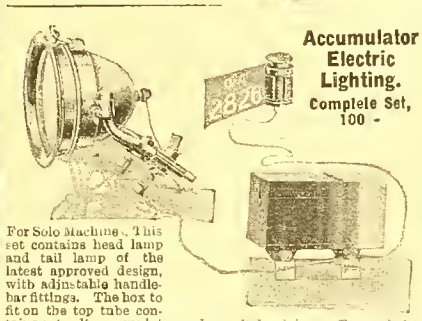
This is a small fitting to enable owners of gas lamps fitted with burners of the Roni type (round stem) to make their lamps into electric.

The "adapter" fits over the existing burner with a tight fit, and is connected to an electric wire and battery.



BRITISH HORN Price 21/6



Accumulator Electric Lighting. Complete Set, 100 -

For Solo Machines. This set contains head lamp and tail lamp of the latest approved design, with adjustable handlebar fittings. The box to fit on the top tube contains a 4-volt accumulator and a switch, giving sufficient light for the two lamps for approx. 10 hours at one charge. It, without doubt, fills a long-felt want for solo machine lighting.

F.R.S. LAMPS, "BEAM" Works, Pershore Street, BIRMINGHAM.

MOTOR CYCLES FOR SALE.

Miscellaneous.

LARGE Stock Second-hand Motor Cycles and light cars for sale or exchange.—Parish, Motor Exchange, Preston. 'Phone: 113. [X0501

LONGMAN Bros., temporary address 46, Hillcrest Rd., Acton ('Phone: 1578 Chiswick).—If you wish to have a machine for the 1919 season, place your order now. Early deliveries of Douglases and other well-known makes. Let us sell your old machine pending delivery of the new mount. [1203

JONES' Garage have in stock Ariels, B.S.A.'s, Douglases, new 1918 Matchless, Allons, new O.K.-J.A.P.'s, Indians, Levis, Triumphs, Rovers, Enfields, A.J.S., Zeniths, new Dalm 2-strokes, etc., etc.; send for list; cash, exchanges, or deferred payments. See next week's adverts.—I, The Broadway, Muswell Hill. 'Phone: Hornsey 2562. [0961

SPECIAL Bargains.—2¾h.p. Enfield, 2 speeds, £16/10; 2½h.p. Calthorpe-Jap, 1915, Enfield gear, £22/10; 1916 Auto-Wheel with 3-speed cycle, £15/15; Auto-Wheel, separate, £7/10; 2¾h.p. Allon, 1916, 2 speeds, clutch, £35/5; 6h.p. 1913 Rudge, Multi gear, big single, £29/15; 6h.p. 1911 Rex, £11/15; 3½h.p. Rex, 1910, low built, £11/15; 3½h.p. 1911 Humber, 2 speeds, £18/15; send stamp for detailed list.—Booths Motories, Portland Place, Halifax. 'Phone: 1062. [9743

WANDSWORTH Motor Exchange.—Great bargains: F.N., latest 5-6h.p., 40 gns.; P. and M., 35 gns.; 1916 Hobart, 25 gns.; 1916 Calthorpe-Jap, 25 gns.; 1914 Douglas, almost new, 42 gns.; 1915 Douglas, T.T., 45 gns.; 1914 Ariel, 33 gns.; 1913 F.N., 28 gns.; Bradbury, 21 gns.; Bradbury, 16 gns.; Douglas, 12 gns.; Rover, 3½h.p., £8/15; 1914 Douglas combination, 55 gns.; Humber combination, nearly new, 45 gns.; Clyno combination, 42 gns.; 1914 O.K.-Precision, 23 gns.; Brown twin, 18 gns.; 1918 brand new Phœnix torpedo sidecar, 12 gns.; exchanges entertained, also easy terms.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). 'Phone: Battersea 327. [1081

SURPLUS Stock: Cash offers considered.—1915 A.J.S. combination, £79/10; 1913 3½h.p. 3-speed Bradbury, £26/10; 3½h.p. 2-speed N.S.U. and new coach sidecar, £26/10; 3½h.p. 2-speed Roach, free engine, and new 1918 coach sidecar, £24/10; 5-6h.p. Rudge-Multi and sidecar, £45; 1913 6h.p. 2-speed Rex and coach sidecar, £39/10; 1914 6h.p. 2-speed Rex, wants attention, £32/10; 2¾h.p. 3-speed Rex, £22/10; 2-speed twin Rex, £18/10; twin m.o.v. Rex, £14/10; 3½h.p. Tourist Trimmph, £18/10; 2½h.p. 2-speed Lloyd's Villiers, £25/10; 1915 Morgan de Luxe and accessories, £95; 1914 9.5h.p. Stellite car, 195 gns.; 1914 8h.p. Perry, £125.—Halifax Motor Exchange, (new address) 18a, Union St. South, Halifax. [1116

pool. [X0197

SIDECAR ATTACHMENTS.

BASTONES' for Sidecars at low prices.—228, Pentonville Rd., King's Cross, London, N.1. [9443

SIDECAR, coachbuilt, extra wide, 26×2½in. Dunlop; £9; after 6.—Smith, 37, Gosterwood St., Deptford. [1178

PHŒNIX Coach Sidecar, condition as new, medium weight, new tyre; £8/10.—Heartfield, 195, Wightman Rd., Hornsey. [1124

A.J.S. Sidecar, run 100 miles, 1918, off 1918 Military Model; £22, no offer.—Lieut. Fiennes, Yuxal Lodge, Burton-on-Trent. [X0484

SPORTING Model Dark Blue Torpedo Phœnix Sidecar, complete, as new; £15.—Emerson, Southville, Manor Rd., Walton-on-Thames, Surrey. [1141

NEW High-class Underslung Sidecar Chassis for Indian, Harley, or American Excelsior; £5/19/6.—Motor Exchange, 18a, Union St. South, Halifax. [1119

FARLOW Sidecar Chassis, 4 only, complete with tyre, springs, and quick detachable joints; £4/15 each.—Farrar, 19, Hopwood Lane, Halifax. [1222

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good selection of second-hand sidecars. A visit would repay you. Also several new Phœnix bodies, sporting and touring. [9448

G.K. Sidecar Co.—'Phone us, Holborn 933, for quotation for renovating your sidecar. New and second-hand sidecars in stock. Hoods, screens, aprons, etc. Reasonable charges.—336, Gray's Inn Rd., W.C.1. [X0288

PHŒNIX Sidecar Bodies, coachbuilt, and enamelled various colours, well sprung both back and front, quick detachable couplings, Palmer or Bates tyres, suitable for engines up to 4h.p.; price £12/12 cash, or 23/4 a month.—Metropolitan Machinists Co., Ltd., 248, Bishopsgate, London, E.C. [1197

SIDE-CARRIERS AND PARCEL-CARS.

FOR Sale, 1915 Autocarrier, 6h.p., fitted with van body, good condition; can be viewed by appointment.—Box L7,957, c/o *The Motor Cycle*. [1104

12-14h.p. Panhard, box body, carry 15-cwt., good condition; exchange good combination or Morgan.—Woodville Laundry, Woodville Rd., Thornton Heath. [1094

TRICARS FOR SALE.

TRICAR, twin 6h.p., water-cooled, running order, engine, chains, and tyres only run 1,000, seats tandom, make good trade delivery motor; £30.—H. Carter, 50, Cambridge St., Plymouth. [X0375

MOTOR TRICYCLES.

INVALID'S Motor Tricycle, 1h.p., controlled entirely by hand, easily managed and reliable, grand little turnout; price £65.—Rayner, 12, George St., Black-

HOODS, WIND SCREENS, ETC.

ORTO Wind Screens, fitted by Harley-Davidsons and all leading manufacturers; Ortomatic in action. —Atkinsons, 306, Uxbridge Rd., W. [8143

WIND Screens.—The Standard, 27/6; folding top, 32/6; double side wing screen, 45/-; the Fitall, 28/6; the fixed, 24/-; the Orto, 34/6 and 62/-, and 60/-; Bluemels, 42/-; the Walbro, 36/-; fawn waterproof hoods, with stroag wood frames and plated fittings, 42/-, 48/- and 63/—Jnao Showrooms, 248, Bishopsgate, London. [8945

BODIES.

CANE Sidecar Bodies.Several to clear at 50/- each, worth £5. Write for design.—The Willowbrook Co., Leicester. [0901

BASTONE'S for Sidecar Bodies.—Several light wicker and coachbuilt bodies; also tandem and torpedo bodies at clearance prices.—228, Pentonville Rd., King's Cross, London, N.1. [9044

SIDECAR Body Designs for the trade only. Working, coloured, pencil, or line drawings of original designs, also working drawings full sized or to scale.—Cooper's Vehicle Journal, Ltd., established designers to the coach trade for over 80 years. Consult us when designing new ideas.—20, Tudor St., London, E.C.4. [0818

30 Sidecar Bodies (steel stamped), makers Messrs. Joseph Sankey & Sons, Ltd., same are upholstered, but not painted or varnished. We have also a quantity of chassis, frames wheels, etc., together with a large quantity of the necessary fittings for the building up of same. We are prepared to accept an offer for the whole of the above, or would sell separately; inspection by appointment.—Apply, G. James and Son, Ltd., 57, Green Lane, Wolverhampton. [X9153

RUNABOUTS AND CYCLE CARS.

A.C. Sociable, 1913, hood, screen, lamps, horn, good condition; bargain, £29.—Coales, 39, Oxford St., Wellingborough. [X0466

1914 Sporting Model Morgan, repainted, overhauled, and specially upholstered; price £85.—Write, Pattison, 87, Allesley Old Rd., Coventry. [X0463

RIDER TROWARD and Co. for Morgans, Swift, Phœnix, Sizaire-Naudin, Lagonda, Carden, Bayard, etc., see small advt. under Cars. Exchanges. [9447

MORGAN, 8h.p. J.A.P., complete with hood, screen, and all lamps, speedometer, etc., in almost new condition; £98.—Hopkins, New St., Ledbury. [X7262

MORGAN, 1917 De Luxe model, complete with hood, screen, C.A.V. dynamo, electric lighting outfit and 5 lamps, absolutely new condition throughout; £150.—Hopkins, New St., Ledbury. [X7261

MORGAN, Grand Prix 1917, water-cooled M.A.G. engine, special 3-seater body, 5 electric lamps, painted Royal blue, hood, screen, speedometer, mechanical horn, oversize tyres, disc wheels; £165; Douglas or Matchless part payment.—Bruce Wood, Horn Park, Lee, S.E.12. [1076

HUMBERETTE, late 1914, beautiful torpedo 2-seater, 8-10h.p., mag., 3 speeds, reverse, hood, screen, speedometer, lamps; any examination, any trial; great bargain, 85 gns.; good combination part exchange; also easy terms.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [1079

CARS FOR SALE.

10-12h.p. Humber, 2-seater, dynamo lighting; £75; exchanges.—Palmer's Garage, Tooting. [1133

15-20h.p. 1915 Studebaker, 5-seater, self-starter, dynamo; £175.—Palmer's Garage, Tooting. [1134

SWIFT 1914 2-seater, in perfect condition and running order, complete with all accessories, hood and screen; £130.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

THE H.C. Motor Co., 347, Finchley Rd., have the following cars for sale, all guaranteed to be in perfect running order. Cash or exchanges:

WEIGEL, 1911, 45h.p. chassis only, detachable rims, 2 spare, 4-speed, dual ignition; 98 gns.—Below.

OAKLAND, 6-cyl., 1914, 40h.p., dynamo light and start, Klaxon horn, detachable rims, 2 spare, all tyres as new, just completely overhauled, English 5-seater body, back screen, every accessory; 475 gns.—Below.

NORDENFELDT, 1912, 25h.p., sporting 2-seater, 4-speed, gate, live axle, Binks, Bosch, disc wheels, Stepney, fitted with new Buick radiator, very fast car; 115 gns.—Below.

BELSIZE, 1914, 12-14h.p., 4-cyl., 3-speed, just completely overhauled and repainted, complete with hood, screen, detachable wheels and spare wheel, all tyres nearly new; 160 gns. [1198

TRUMBULL 1916 2-seater, 5 detachable wheels, electric lights, hood, screen, mileage 400; £110. —51, Maplethorpe Rd., Thornton Heath. [1220

SEVERAL Light Cars in stock for sale for cash or on our extended payment system, or your motor cycle in exchange; send for list, stating requirements. —Service Co., 292, High Holborn, London, W.C.1. [8735

ORDER NOW AT

LAMB'S

AND BE IN TIME.

Promptest delivery guaranteed of these makes.

NEW MACHINES.

HARLEY-DAVIDSON 1917 electric Comb.	£135	0
LEVIS, 1918, Model E, 2-speed	£47	10
ROVER 1917 3½ h.p. Combination	£106	0
NEW HUDSON 1917 4 h.p. Combination .	£96	8
CALTHORPE-J.A.P. (2), 2-speed, 2¾ h.p.	£39	19
ALLDAYS ALLON (3), 2½ h.p., single-sp.	£39	12
B.S.A. Immediate expectations.		
ENFIELD, 3 h.p. Immediate expectations.	Etc.	

SECOND-HAND MACHINES.

HARLEY-DAVIDSON 1916 electric Comb.	£84	0
HARLEY-DAVIDSON 1915 electric Comb.	£72	0
ENFIELD (5) 1916-17 6 h.p. Combs. from	£95	0
B.S.A. (3) 1915-16-17 4½ h.p. Combs. from	£65	0
ARIEL (2) 1916-17 3½ h.p. Combs. from	£73	10
A.J.S. (2) 1914-15 6 & 4½ h.p. Combs. from	£77	10
ALLDAYS ALLON (3), 1916, 1917, 2 & s-sps.	£29	10
DOUGLAS (2). 1912-14, s.-sp. & 2-sp., from	£17	10
JAMES (3) 1915 & 1916 4½ h.p. Combs., from	£63	0
TRIUMPH (2) 1911-13 solo from	£19	10
LEVIS 1913 & 1914 2¾ h.p. solos from	£25	0

And many others.

LAMB'S,

151, High St., Walthamstow, E.17

'Phone: Walthamstow 169.

50, High Road, Wood Green, N.22

'Phone: Hornsey 1956.

(Only Depot in this district.)

Hours 9 to 8. Thursdays 1 p.m

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650×65 Dunlop Tubes; usual price 13/3; our price **7/9,** post 3d.
710×90 (will suit 700×80 covers); usual price 17/9; our price **8/11,** post 3d.

PEDAL CYCLES FROM STOCK.

"Wearwell" Pedal Cycles (Lady's), 24in. (plus 10/- for aluminium rims)	£12 12
Ditto (Lady's), 22in. (plus 10/- for aluminium rims)	£12 12
Ditto (Gent.'s), 26in.	£12 12

SPARES.

J.A.P. Pattern Valves, 4, 6, 8 h.p.	6/9,	post 3d.
Douglas Pattern Valves	4/3,	„ 3d.
Triumph Pattern Valves	4/-,	„ 3d.
"Vevo" Oil Guns, with 3 nozzles	4/-,	„ 3d.

LAMPS.

T.W.R. Aluminium Electric Head Lamps, complete with bulb (post free)	13/6
Ditto Side Lamps, ditto (post free)	10/6
Ditto Rear Lamps, ditto (post free)	10/6

Sole London Agents for the **A.J.S.** and **British Excelsior** Motor Cycles.

H. TAYLOR & CO., LTD.

Showrooms : 21a, STORE STREET, W.C.1.
Wholesale : 38, ALFRED PLACE, W.C.1.

Garage: Tottenham Mews. 'Phone—Museum, 1240.
Telegrams—"Dynametro, Westcent, London."

CARS FOR SALE.

SPORTING Cars.—Mercedes, 35h.p., reconstructed, 235 gns.; Mercedes, 120h.p., 185 gns.; Isotta-Fraschini, 45h.p., 325 gns.; also 45h.p. Nordenfeldt, 40h.p. Weigel, 40h.p. Oakland (6-cyl.), and 60h.p. Gregoire (6-cyl.).—Below.

MEDIUM Touring Cars.—Briscoe, 15.9h.p., 1917, 195 gns.; Briscoe, 1918, new, £275; Belsize, 1914, 4-seater; Rover, 1911, 4-seater, 59 gns.; R.M.C., 1916, 5-seater, 235 gns.—Below.

LIGHT Cars.—Carden Monocar, 5-6h.p., 55 gns.; Phœnix, 7-9h.p., 69 gns.; Lagonda coupe, C.A.V. dynamo, 149 gns.; Morgan, 1915 Grand Prix, 115 gns.; ditto, 1914, 95 gns.; Morgan, sporting, 1914, 69 gns.; Sizaire-Naudin, 9h.p., 45 gns.; Swift, 1915, 8-10h.p., 119 gns.—Below.

RIDER TROWARD and Co., 31, High St., Hampstead, will undertake exchanges for any of the above, or accept instalments with free storage till after the war. [9446

WAVERLEY 10h.p. Chassis (780×90), artilleries, Henley tyres, heavy brass radiator, 2-speed, reverse, glass wind screen, make grand cycle car; take £15 for the lot; what offers, exchange?—A.E.R., 62, Knighton Park, Sydenham. [1030

STARTLING Announcement. Everybody is putting their prices up! I'm putting mine down! I mean to have your business. That's why I sell six cars a week. Every price in following advertisement reduced. Many of the cars in exceptional condition, and all dates advertised are guaranteed accurate; 6h.p. A.C. box autocarrier, late model, Sankey wheels, watertight mag., worth treble, £22/10; 8-10h.p. Panhard lorry, £32/10; 10h.p. Unique parcels lorry, modern, light car type, wire wheels, pointed radiators, £45; 15h.p. K.R.I.T., torpedo, monobloc, gate, Claudel, detachables, £62/10; 10h.p. Darracq, 2-seater, late model, detachable wire wheels, £68/10; 15h.p. racing car, actual Brooklands winner, 70 m.p.h., streamline skeleton 2-seater, £72/10; 12-16 h.p. Motobloc chassis, unit engine construction, sporty, £77/10; 15h.p. Charron chassis, monobloc, Solex, £77/10; 14-16h.p. Darracq traveller's omnibus, monobloc, gate, Zenith, £82/10; 12-15h.p. Hupmobile, semi-sporting 4-seater, smartly repainted, £88/10; 8-10h.p. 1913 Alldays 2-seater, Zenith, wire wheels, smart, £88/10; 12-16h.p. Star, 2-seater, gate, Zenith, £120 last week, now £90; 2-ton Berliet chassis, twin solids, new gears, Solex, 4 speeds, £90; one Thames bungalow plot at Sunbury, £95, freehold; 8-10h.p. Renault platform lorry, 8ft.×5ft., taxi type chassis, £112/10; 15h.p. Bayard 1-ton van, solids all round, twins behind, £115; 38h.p. Daimler chassis, £115; 30h.p. National sporting 4-seater, £115; 8-10h.p. Humberette, water-cooled, special sporting 2-seater, streamline, disc wheels, £120; 15-25h.p. live axle Panhard chassis, formerly £150, now £120; 12-15h.p. F.I.A.T. taxi-landaulet, monobloc, gate, £125; 12-14h.p. Renault landaulet, £130; 30-40h.p American 6-cyl. 4-seated speedster, special competition car, worth double, £132/10; 20h.p. 6-cyl. Standard sporting 2-seater, good chassis, but dnd body, £132/10; 18h.p. Maxwell streamline 4-seater, monobloc, enclosed valves, £137/10; 2-ton Milnes-Daimler van, live axle, H.T. mag., Zenith, twin solids, £142/10; 38h.p. Wolseley chassis, enclosed valve model, detachable wire wheels, few small parts missing, £175; 2-ton De Dion van, heavy commercial, 15-20h.p. 4-cyl. engine, live axle, twin solids, formerly £275, now £175; 15.9h.p. Arrol-Johnston, torpedo, enclosed valves, detachable Sankey wheels, splendid condition, £182/10; 3-ton Straker-Squire lorry, cab front, twin solids, new tyres, H.T. mag., Zenith, bargain, £235; 1914 Palladium 1-ton van, solids all round, monobloc, enclosed valves, Zenith, £242/10; 20h.p. Crossley, torpedo, monobloc unit construction, Zenith, wire wheels, £247/10; 16-20h.p. Sunbeam chassis, enclosed valves, detachable wheels, 4-speed, Claudel, watertight mag., £250; 13.9h.p. B.S.A., 2-seater, Knight engine, detachable wheels, £265; 3-ton De Dion commercial chassis, latest round radiator type, worm drive, enclosed valves, twin solids, steel wheels, £350; another, with lorry body, complete, £395; 4-ton C.T.C. American platform lorry, platform 13ft.×6ft., believed 1917 model, enclosed valves, centre gate, f.w.d. tractor type, splendid condition, reduced to £425; 2-ton Napier lorry, cab front, twin solids, enclosed valves, steel wheels, £575; 30h.p. 6-cyl. Wolseley ¾ landaulet, enclosed valves, detachable wire wheels, £650; 4½-ton Garner lorry, enclosed valves, twin solids, beautiful condition, bargain, £650.—Douglas S. Cox, the absolutely straight motor man, 6c, Lansdowne Hill, West Norwood, S.E., have all the above actually in stock and on view. Hours 8 to 6.30, including Saturdays. Please call. No business Sundays. Established 1902. [1193

EXTENDED PAYMENTS.

EXTENDED Payments.—All makes supplied, new and second-hand; lowest terms.—Service Co., 292, High Holborn, London. [8745

ENGINES.

1912 Rex Engine, 3½h.p., less piston; or sell separately.—A. Pointer, 36, Vincent Rd., Norwich. [1037

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good selection of second-hand engines for sale. [9449

4¼h.p. Stevens Engine, good order, with Grado Multi gear; £5, or separate.—Thornton, Moore Lane, Sherburn-in-Elmet. [X0493

4h.p. J.A.P., mechanical valves, with silencer, B. and B. carburetters, in good condition; price £5/10. —172, St. Ann's Rd., N.15. [1056

FAFNIR 5-6h.p. Twin, m.o.v., late model, less magneto and carburetter, beautiful engine; £7/10.—Butterworth's Garage, 64, Mill Lane, Brixton Hill. [1154

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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SOUTH AFRICA—Central News Agency, Ltd. PARIS—Smith's English Library, 248 Rue Rivoli.

Need for Reform.

IN the last issue of *The Motor Cycle* there appeared an article—"Motor Cyclists and the Election"—which cannot but fail to interest the majority of our readers. In it the writer pleaded that motor cyclists might combine by asking their M.P.'s or prospective candidates to promise support to amendments to the Motor Car Act.

The M.P. *could* be of great assistance to the motorist, but the position is that he simply dare not be, since motorists are in the minority, and consequently motorists have to endure the anomalies of the regulations affecting the use of motor vehicles.

We are inclined to agree with our contributor in most of the points he puts forward, such as the abolition of the speed limit, the recognition of main roads at cross-roads, the examination of candidates for driving licences, and the simplification of registering motor cycles; but he has rather failed in regard to the local taxation licence, the cost of which as applied to motor cycles is higher in proportion to weight and power than in the case of any other vehicle.

The local taxation licence, formerly known as the Inland Revenue tax, was taken over by the Councils in 1907, and is a relic of the old carriage tax more recently made to apply to motor vehicles, the basis of taxation being £1 for motor cycles, which are very inadequately defined, and according to the Treasury rating of h.p. in the case of motor cars. The licence becomes due on January 1st, and enables the person who takes it out to keep one motor cycle; that means that he may own a 3½ h.p. A. on the first day of January, and on the 16th of that month he may sell it and purchase a 2¾ h.p. B., and the same licence will still remain in force. The licence belongs to the person who takes it out, and if he sells his machine the licence cannot be transferred. If the motor cyclist does not become the possessor of a machine until many months of the year have elapsed he still has to take out a licence at full fees until December 31st. However, on and after October 1st, when but three months of the year are left, a rebate of only half the fee is allowed. This, of course, should be remedied.

The worst case is that apparent to all at the present moment. The free use of motor vehicles was stopped by the Motor Spirit Restriction Order of 1917, which means to say that those who had taken out local taxation licences for one year had only the use of their motor vehicles for two-thirds of that period. Now that the restrictions have been eased, those who are in the happy position of being able to use their motor cycles are bound to take out a local taxation licence (10s.) for one month or less, and have to renew this again in January.

Unfortunately, nothing can be done in this important matter without a special Act of Parliament. The A.C.U. has done its best in approaching the Customs and Excise officials, but they are absolutely adamant, and at the time of a general election no one can push through a special Act of Parliament to remedy this injustice, which would be removed if the local taxation licence were made available from the date on which it is taken out until the corresponding date of the following year.

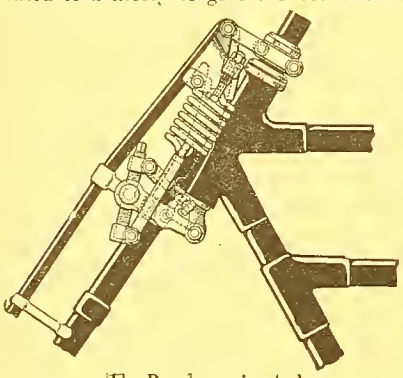
The licence entitles the owner to keep and use a motor cycle. If he keeps a machine which he does not use during any one year he need not take out the licence in respect of it, but if a friend comes along, sees the machine and persuades the owner to sell it to him, the owner is not entitled to take it on the road for a trial run on any single occasion without being liable for the local taxation licence for the whole year, and this, again, is a point which should be remedied. It is desirable that local taxation licences for short periods should be made available to cover, say, a month or even a week, and the case of the motorist should certainly be taken up as soon as matters settle down and Parliament gets working again.

An index to the advertisements in this issue will be found on the page facing the back cover

THE BROPHY SPRINGING SYSTEM.

A Spring Frame allowing of Adjustment to Suit the Load.

MORE than once efforts have been made to design a springing system for cars which is conveniently adjustable. It is well known that there is a great difference in the running of a car when carrying the driver only from its performance when fully loaded, and as this difference is so marked in the case of a vehicle weighing about a ton, compared to which the extra weight of a passenger is small, it may be assumed that motor cycle springing must be calculated to a nicety to give the best results.



The Brophy spring fork.

If the weight of a passenger, more or less, on a car affects the springing problem, one may think that the motor cycle spring frame designed for a 15 st. rider would be far from ideal for another weighing only 10 st., and where the springing is not adjustable it can be regarded much in the light of a compromise. Hence the retention of the spring saddle.

It is perhaps surprising that the majority of cycle springing devices are more or less of the "rule of thumb" order. That is to say, they are designs in which a careful and scientific calculation have not taken a great part. So far it has been the mechanism of springing that has been given prior attention, and, everything considered, the motor cycle world cannot expect more at this stage of development.

There are inventors, however, who have gone a step further and designed devices which are readily adjustable, and the invention of one of these is illustrated here.

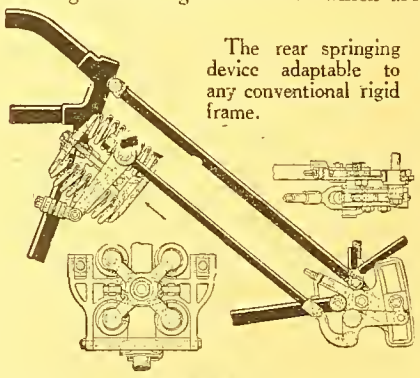
The Brophy design is not a new device exactly. Three years ago we witnesed a demonstration with the invention fitted on a model car chassis, and we may say we were more than surprised at the remarkable results obtained. Mr. Brophy had his model chassis, which was about 6ft. wheelbase and 3ft. track, running on a pair of large rollers, and he demonstrated that it was possible to bounce any of the wheels by means of a baulk of timber, without unduly disturbing a bottle placed on the edge of the "chassis."

The principles of this invention are shown in the right-hand drawing. It is an arrangement of levers and springs, in which as the compression of the spring increases the levers will act with proportionately increased power against the springs, so that a balance is maintained which conduces to a much more delicate adjustment than when ordinary springs are used.

The Motor Cycle Device.

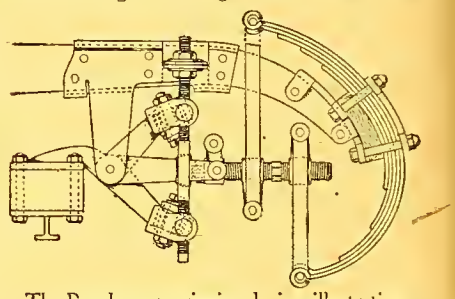
The Brophy springing device for motor cycles is an adaptation of this principle, and, incidentally, the design was made so that the device could be applied to existing machines. The drawings in the group below show the device which was fitted to a James motor cycle.

It will be seen that a pair of brackets are connected to the rear fork ends. These brackets have in them curved slots, in which are carried blocks carrying the rear wheel axle. Upon a carrier, mounted behind the saddle, is fixed an open framing of rectangular form in which are mounted two pivoted lever plates, and in connection with which are arranged two pairs of helical compression springs, each of the springs bearing at one end against an adjustable rigid portion or stud upon the absorber frame, and at the other end against the free end of the pivoted plates, the rear pair of springs acting against one plate and the front pair of springs against the other plate.



The rear springing device adaptable to any conventional rigid frame.

Between the springs a lever extends in a longitudinal direction, which has nuts provided with forks that engage with links having knife edges, which links also engage with hooks on the pivoted plates before referred to, in such a manner that when the lever is oscillated in a vertical plane the two pairs of springs will be simultaneously compressed or allowed to react.



The Brophy car springing device, illustrating the principle of the system.

One end of the lever carries a knife edge on which bears a stirrup frame pivotally mounted upon the absorber frame, and to the free end of this stirrup frame, on each side, are connected rods which are also connected at their lower ends to the front arms of the double armed levers, so that any movement caused by the running of the wheel over an uneven surface will be transmitted through the rods to the stirrup frame and thence to the lever in connection with the springs. The rigidity of the stirrup frame serves to ensure that the slide blocks in the two side brackets shall always maintain their proper relative positions as the wheel axle rises and falls, thereby preventing the wheel from wobbling laterally.

Mr. Brophy also applied his invention to the front wheel, which design is shown in the first illustration.

SOME REMINISCENCES.

IT was a hot afternoon in May when the *Ben-my-Chree*, since sunk by the Turks while serving her country, made fast to the quay in Douglas Harbour. Twenty minutes later, after much mishandling and struggling, visitors' motor bicycles were set ashore. Most of them started easily, but the 4 h.p. Indian and heavy single-cylinder belonging to the writer, made still heavier owing to a thick motor coat on the the handle-bars (it had been chilly on the voyage), refused to show a sign of life. He examined the petrol feed, only to find all in order. Then the happy thought struck him to look at the magneto contact breaker, when lo! the cause of the trouble was evident. A tiny piece of paper rested between the platinum points, and when removed a quick journey was made to the hotel after only thirty seconds' delay.

Two of the *Ben-my-Chree's* late passengers felt somewhat keen disappointment, but the same year they played a far more ingenious trick on a rival journalist, a keen and practical rider, who knew his motor bicycle from A to Z. It was in the city of motors that the said journalist attempted to start his one-longer after lunch. The engine was just as dead as the Indian had been. He overhauled everything without finding the source of the trouble. Then, with scrupulous care, he took down the carburetter, tested the plug, tried the strength of the magneto at the expense of some physical pain. All to no purpose. At last one of the interested spectators suggested that he remove his exhaust pipe to "see if there was a dead mouse inside." The pipe was duly removed, and in the union there reposed a halfpenny, which fitted it exactly.

These incidents occurred so long ago that we may mention the names of the culprits—Fenn and Bowen. They both joined the Army early in the war. Fenn was invalided out after doing good work as a despatch rider, but nothing has been heard of Bowen for a considerable time.

Post-war Costs.

I DO not want to damp readers' ardour, but I have often had to hint during the past four years that we should never again live to buy as much with £1 as we did in 1914. The need for this warning often hits one in the eye when an amateur designer announces in our columns or elsewhere his notion of a baby two-stroke or a cheap cycle car specification. A few relevant facts are slowly coming to hand since the Armistice. For example, "Cantab." gave the following figures in *The Autocar* for November 23rd:

COST OF A CERTAIN 1914 CAR.

Labour	£104 0 0
Material	224 0 0
Establishment charges	124 16 0
	£452 16 0

COST OF A SIMILAR 1918 CAR.

Labour (41% up)	£146 12 9
Material (58% up)	353 18 6
Establishment charges	243 7 0
	£743 18 3

The other day I received a provisional 1919 price list of certain cars confessedly constructed largely of 1914 parts, and wholly built to 1914 drawings and jigs. Its cost has risen about 33%.

A somewhat similar process is bound to affect the motor cycling industry. The *immediate* result must be that *prices* will rise, or *quality* will fall, or *specification* will be simplified. The first solution is that which most manufacturers will adopt for the moment.

And Then—?

THE three pronged alternatives of higher prices, poorer quality, or simpler specifications are not necessarily permanent. A leading financier estimates that whereas £1 to-day only possesses the buying power of 8s. 4d. in 1914, the purchasing value of the sovereign should recover to 12s. by 1922. Simultaneously, scientific production is far better understood in this country: the stress of war has taught us better, quicker, and cheaper ways of doing things, so that if the value of the sovereign stood where it did in 1914, a machine listed at £50 four and a half years ago might have sold at £40 to-day. On the other hand, labour has got its tail well up. Many overdue social reforms are on the *tapis*, most of them expensive. I hae ma doots whether the cheap era will ever return.

When we must Choose.

EVENTUALLY, therefore, the buying public will probably drive motor cycle manufacturers to adopt a common policy. Selecting purely arbitrary figures for the sake of illustration, the three-point alternative might stew down to something like this:

(1.) A 3½ h.p. three-speeder of more than 1914 quality at £75.

(2.) A 3½ h.p. three-speeder of inferior quality at £50.

(3.) A 2½ h.p. baby two-stroke of good quality at £50.

Anybody with whom money is tight will naturally plump for (1) or (3) rather than (2). I see no reason why the poorer of us should not keep a first-class machine for ten years' hard work. Some of the 1914 'buses were quite good enough for a working life of this length.

Motor Cycling for Elderly Men.

I READ "White Knight's" plea for an elderly man's motor cycle with much interest. My own experience of elderly riders is that they are either very hard or very soft. The hardy type will ride anything he can start. The soft type will only ride something docile, and even at that restrict their runs to fine weather and short distances. "White Knight" belongs to a less common and intermediate class. He wants a mount which does not require wheeling about or propping up, but is comfortable, skidproof, and well protected. All this, of course, can be provided—at a price. We have yet to see the type of machine one could reasonably describe as an oldster's cycle car: practically every existing design is built with an eye to the young. It really amounts to this. Most oldish men who can afford to motor at all buy either a costly car or a Ford. Is it worth a manufacturer's while to produce a special 'bus for a very limited market? I know men of "White Knight's" type who use the Morgan or the 5 h.p. A.C., but they generally clamour for various modifications suited to their years, strength, and sensitiveness to weather. For a year or two I fear the oldster must rest content to make the best of the youngster's 'bus.

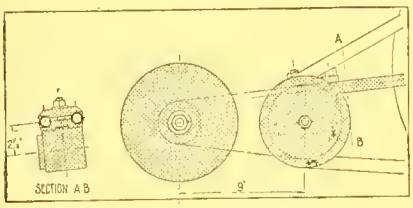
Cheap and Efficient.

YESTERDAY I inspected a home-made carburetter, equipped with a water jacket. The device added a little to the weight and cost of the vaporisers: the filler-hole had no cap, and there was a cock at the bottom by which the jacket could be drained. With the aid of about a teacupful of boiling water the owner could start up his engine promptly on almost any old fuel. I suppose our machines will undergo further electrification after the war, and given a sturdy battery I can offer a warm welcome to electric hooters and to electric lighting sets. But I don't want to see the motor bicycle over-electrified. After all, the average motor cyclist is not a very technically-minded person, and if the trade stick on an electric starter and an electric carburetter heater as well, the circuits will be growing a trifle complex. Nevertheless, seeing the quality of fuel with which we are threatened in years to come, some form of carburetter heating seems to be indicated, and I commend the above as cheap, simple, foolproof, and efficient.

Converting a Single-speed to a Two-speed Model.

How a Two-speed Gear was fitted to a Lightweight.

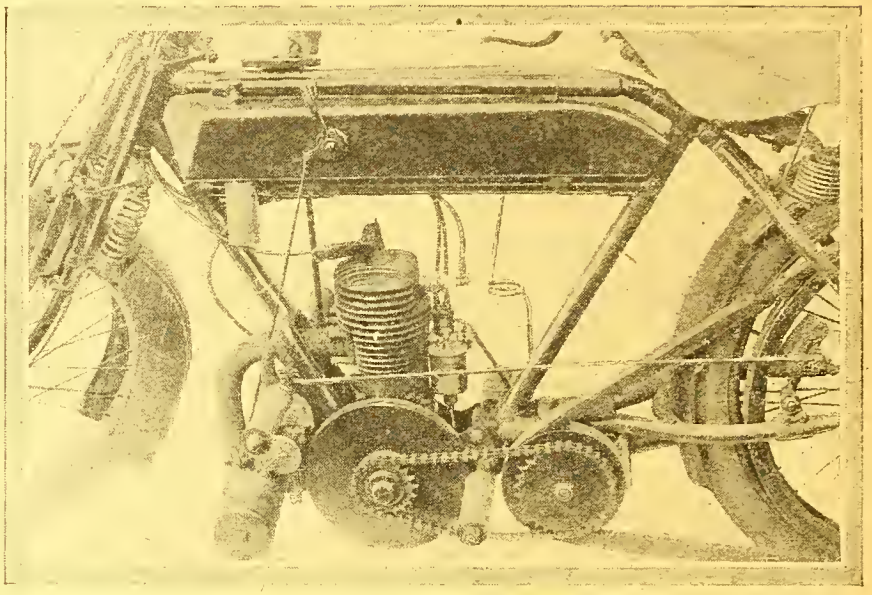
ALTHOUGH the following modifications were made to meet certain specific conditions, I think there is little doubt that there are others who would carry out similar alterations to their machines if they knew how to go about it. Briefly, then, I purchased a 1914 2¼ h.p. two-stroke New Hudson on behalf of a friend who required a



A Renold ½in. pitch chain, No. 6,195, was used.

lightweight machine, he being not so active as he once was. The district in which it was intended to use the machine being hilly, and my friend weighing nearly sixteen stone, it was decided that a two-speed gear was a necessity. We therefore advertised in *The Motor Cycle*, and secured a Roc two-speed countershaft gear for 37s. 6d. in fair condition, which we decided to fit ourselves.

A glance at the sketch will show that the original belt line was maintained. To accommodate the chain sprocket it was therefore necessary to bring the flywheel somewhat towards the engine. This

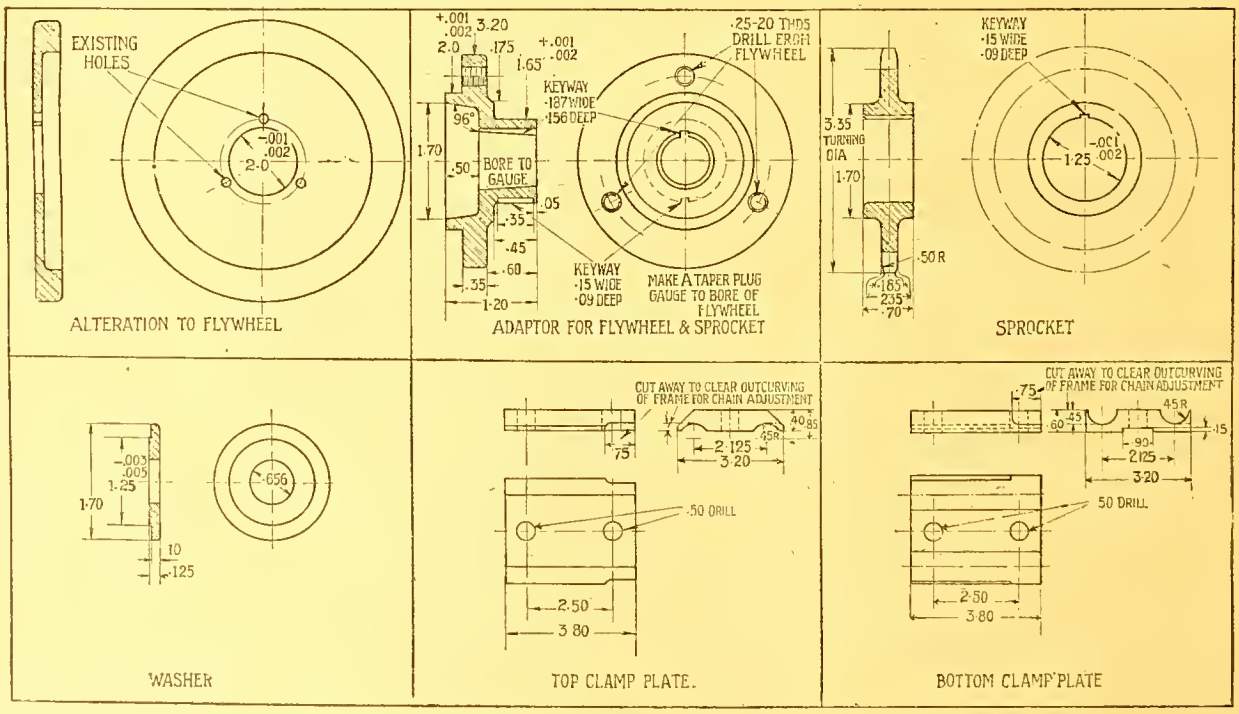


The 2½ h.p. New Hudson, showing the alterations to the flywheel, and the Roc two-speed countershaft gear.

was accomplished by cutting out the flywheel boss in the lathe and boring out, just leaving the three holes for the attaching screws.

The next and most important job was to make an adapting piece to take the flywheel and the chain sprocket. The flywheel, by the way, had to be reversed and placed with the rim boss toward the engine to give extra clearance for the chain.

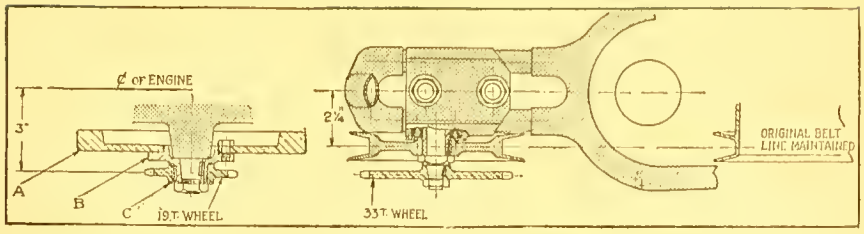
A taper gauge was made to fit the old pulley boss shaft sleeve and the new adapter bored to fit this.



A working drawing clearly showing the practical details of the conversion.

Converting a Single to a Two-speed Model.—

The shape of the adapter is shown. It was bolted up to the flywheel and the chain sprocket keyed on. When the flywheel was fitted the adapter was riveted over, making a solid job. The engine-shaft chain sprocket was a nineteen tooth wheel, and the countershaft carried a thirty-three tooth sprocket. The gear box was attached to the frame by special clamps made from one piece of mild steel, drilled and milled, then cut through. The final drive was a ⅞in. belt, the belt pulley having been increased to 6½in. diameter with obvious economy.



Arrangement of the conversion: A, altered flywheel; B, adapter; C, washer. The original belt line is retained.

THE CASE FOR CARRIER RIDING.

"The Motor Cycle" has never recommended the practice of carrier riding, and it is known that it has been the cause of fatal accidents. Still, many motor cyclists make a habit of carrying passengers in this way, which is certainly convenient and economical. That being the case, it is desirable that they should have some information of the best methods of indulging in this particular practice. There is, we believe, but little danger on dry open roads; it is when a sudden emergency arises that the presence of a passenger on the carrier may make the difference of getting through a tight corner or not.

THOUGH the argument as to the legitimate use of the "flapper bracket" has been raging ever since this fitment first became an integral part of the machine, I am unable to recollect ever having seen the case for pillion riding put clearly forward.

It is in the hope of doing this and thereby correcting the prevailing notion that it is comparatively unsafe, that I am emboldened to submit the following to the critical consideration of readers.

Before making a brief examination of the two methods of passenger transport—pillion and sidecar—let me first say that my remarks are not intended to apply to those of us who, though not quite yet in the sere and yellow leaf, have learnt to appreciate the maximum of comfort "always," but to those who have yet average health and good nerves.

For pillion riding it will be admitted that (given identical machines) it is:

(1.) Faster on hills.
(2.) Safer at speed on corners.
(3.) Lighter on petrol.
(4.) Traffic dodging is easier.
(5.) In the event of a spill the passenger is thrown clear.
(6.) Less steering strain on the driver's wrists.

To the sidecar I will concede:

(1.) Greater comfort (for the passenger).
(2.) Safer on grease.

Correct Distribution of Weight.

Given that the weight be properly placed, I do not see how it can be argued that two 7 st. riders on one machine can be any more unsafe than one weighing 14 st.

Let us examine where the weight falls when the ordinary diamond frame is ridden solo. Minus the rider, granted the engine be set centrally between the wheel centres, the weight falls equally upon them. With the rider mounted the major portion is upon the rear wheel. This is as it should be, because being the driving wheel it requires holding to the road. Now with a passenger mounted upon the carrier of the usual machine, the practice upon which seems to be to set the saddle well back, what happens? The rider himself is sitting almost on top of the fulcrum point made by the rear axle, and the passenger's weight, falling entirely to the back of the axle, tends to tilt the rest of the machine in the air, causing the front wheel to be extremely light and rendering the steering difficult. This lightness of the forepart also tends to cause the machine to swing laterally round the point of contact of the rear tyre with the road. This is the peculiarly unstable effect noticed on some "flapper fitted" machines.

Running Mounts.

The cure for this undesirable state of affairs may briefly be stated thus: "Carry the weight or the greater portion of it between the hub centres."

It is wonderful what a difference it will make to move the saddle two or three inches forward. Lightness on the front wheel with its inherent feeling of instability vanishes, and one is in danger of forgetting that a passenger is being carried. With the present state of the roads, a machine is far more comfortable with a weight on the carrier than without, it keeping the rear wheel down.

A few words on mounting, running conditions, etc., will be found helpful. I have found that the best method of mounting on a fixed single-geared machine is to seat the passenger side-saddle facing the right, holding the back of the carrier with the right hand, the left being placed on the driver's right hip, or holding his belt as he stands ready to start. (I recommend facing the right, as the passenger's legs do not then foul the driver during a running start.) The driver can then make the usual running start, hop on the footboard or rest, sit on the saddle, and throw his right leg over the top tube. It sounds somewhat acrobatic, but with a little practice can be done even with T.T. bars.

Let me strongly condemn the practice of carrying male passengers astraddle, as it not only throws the weight further back, but in the event of a spill one leg is bound to get caught; whereas with the side-saddle position, by raising the legs at right angles to the body, the passenger cannot help being thrown clear of the machine. With a free engine or speed geared machine, though starting is obvious, it helps the engine to paddle with the feet a bit whilst letting in the clutch.

Regarding suitable gears, I find on a 3½ h.p. single Triumph that a gear of 5 to 1 is sufficiently low for average running in the Midlands, and have done a lot of good work on a 4½.

I generally set the magneto about 2 mm. less advanced on the compression stroke than for solo work.

As regards carburation, I find a 30 jet on an Amac, a 33 on a B. and B., or a 40 on a Senspray give excellent results. Drive entirely on the throttle; it steadies the machine.

Give half as much oil again as when riding solo.

Petrol consumption is increased by about one-third for town riding and about one-fourth on long runs.

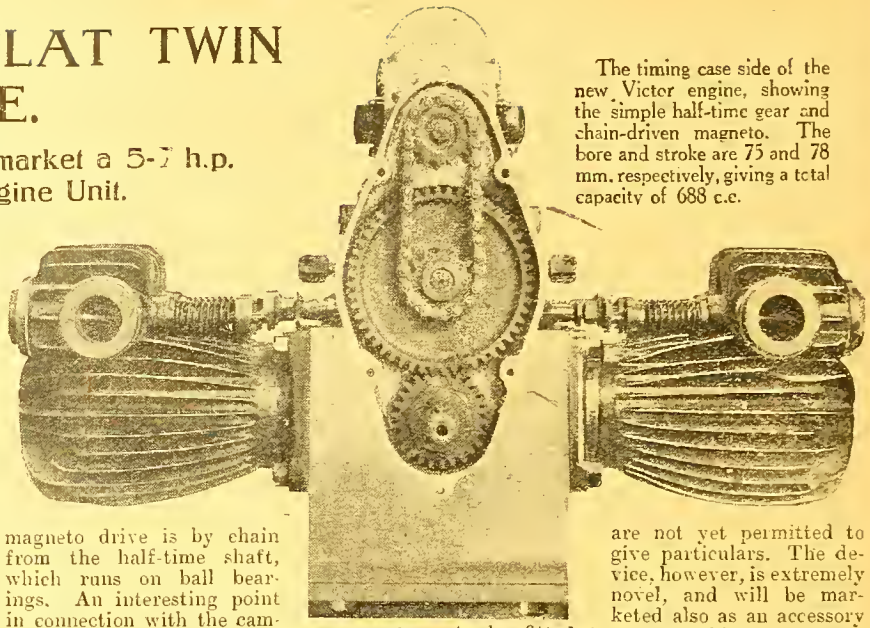
S. C. RAYNER.

THE FARM TRACTOR HANDBOOK.

IT is almost impossible to exaggerate the importance of agriculture to this country at the present time. Therefore the little book on the application of motor power to farming operations published by the *Agricultural Gazette* (Messrs. Iliffe and Sons Ltd.) makes a very opportune appearance. As the book is meant to appeal to those whose knowledge of the internal combustion engine is presumably very limited, it very properly treats the subject in a simple manner, dealing thoroughly with elementary principles. The various tractors are illustrated and described, and many hints are given as to their most economical use, while the agricultural implements themselves are not forgotten. Every progressive farmer should carefully consider the desirability of motor traction if he wishes to get the best results from his farm with the labour at his disposal.

THE VICTOR FLAT TWIN ENGINE.

New Company formed to market a 5-7 h.p. Opposed Twin Engine Unit.



The timing case side of the new Victor engine, showing the simple half-time gear and chain-driven magneto. The bore and stroke are 75 and 78 mm. respectively, giving a total capacity of 688 c.c.

IT will interest readers generally, and certain motor cycle firms in particular, that a firm of engineers in Coventry has formed a new company to manufacture an engine unit for the assembling trade. This unit is a 5-7 h.p. flat twin—the first of the type to be offered to motor cycle makers who prefer to leave engine production to specialists in that particular line. Since motor cycles have existed, singles and V twins, engines and gear boxes, have been obtainable as units, but those makers who have not been in a position to make a flat twin and have favoured the type have not been able to market a machine fitted with such an engine because none has been available.

Special Big-end Design.

Incidentally, the assembling trade now has the choice of almost every type of engine suitable for motor cycles, and it only requires a four-cylinder unit to complete the list.

The Victor engine, as the new flat twin unit is called, has a bore and stroke of 75 and 78 mm. respectively, the cylinders being placed slightly off-set from the centre line. The cooling fins are longitudinal, and conform to a "pear" contour. Each piston has two stepped rings, the gudgeon pin being held in position by brass end cages.

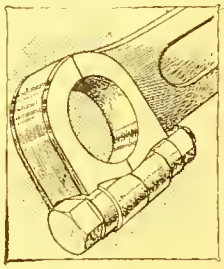
The design of the big ends is somewhat unusual, a single bolt secures two halves of the split bush, and the bolt is not under the same stresses as in the case of the conventional split big end.

The Magneto Drive.

An outside flywheel is fitted on the off side of the engine, with a chain sprocket between it and the crank case. This side of the crankshaft is supported on two ball bearings of ample size, the half-time wheel being between them. The timing and magneto gear is extremely neat. The half-time wheel is of substantial size, and is driven directly by a pinion in the engine-shaft, while the magneto drive is by chain from the half-time shaft, which runs on ball bearings. An interesting point in connection with the camshaft is that, by removing a cap on the timing case, it may be withdrawn.

Valves and Lubrication.

The valves are placed above the cylinders, and are located side by side in a horizontal position, operated by rockers carried on solid shafts. The rockers have roller contacts, and are fed with oil through spiral grooves cut in their shafts. The crankshaft is of the one-piece type, balanced and made of high tensile steel hardened and ground.



The big end of the Victor engine

The lubrication system is by splash, but care has been taken in the design to provide a good supply of oil at all points. The oil, in the first place, is fed to large bosses on each side of the crankshaft, and scoop rings on the latter collect it and, by centrifugal action, force it through oilways to the main bearings. The big ends are fitted with scoops, which not only collect oil for these bearings, but throw up a supply of oil for the cylinder walls and camshaft. A large capacity sump is embodied in the base of the crank case.

A new and ingenious system of oil delivery will be embodied, but of this we are not yet permitted to give particulars. The device, however, is extremely novel, and will be marketed also as an accessory to be fitted to any machine at present fitted with drip feed or conventional hand pump.

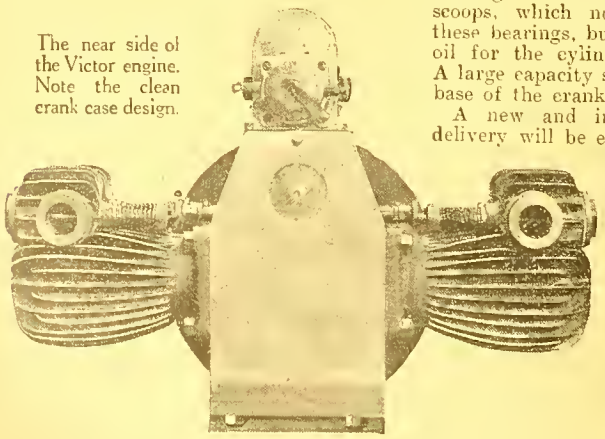
The method of fixing the engine in the frame is simple. The bottom of the crank case is split, and between the two members are circular grooves intended to take two parallel tubes of the frame. The crank case is clamped to the supporting tubes by bolts on the under side. Thus the maker may design a frame to individual requirements. This may be duplex, loop, or more or less of the conventional type. The tubes may come down to the crank case on each side of the cylinders, or the whole of the engine may be within the frame.

The Approximate Output.

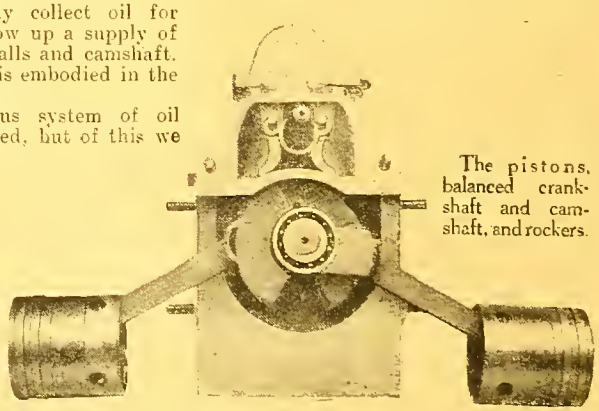
It is anticipated that the new company, which is known as the Coventry Victor Motor Co., Ltd., will be able to turn out one hundred engines per week.

We are informed that most of the necessary jigs and tools are now ready, and that the works are equipped with the latest machinery for this class of work, as during the war the concern has been engaged almost exclusively upon aero engine work.

The registered offices of the company are at 137, Cox Street, Coventry.



The near side of the Victor engine. Note the clean crank case design.



The pistons, balanced crankshaft and camshaft, and rockers.

THE POSITION OF THE SIDECAR BODY.

A Consideration of the Factors Governing the Chassis Construction.

THE present-day coach-built sidecar is a development of the old cane chair which, in turn, had been evolved from a trailer chassis for which it was designed. When the sidecar made its appearance attached to the side of a motor bicycle, engineers condemned it as absolutely unmechanical. Engineers bring forward a hundred arguments to prove this point, and the sidecar designer can only answer that it works and works well, to which one may add that it has been the means of introducing more people to the joys of motoring than any other single thing, and it has done this without an overwhelming number of accidents which one would expect from something so opposed to good engineering principles.

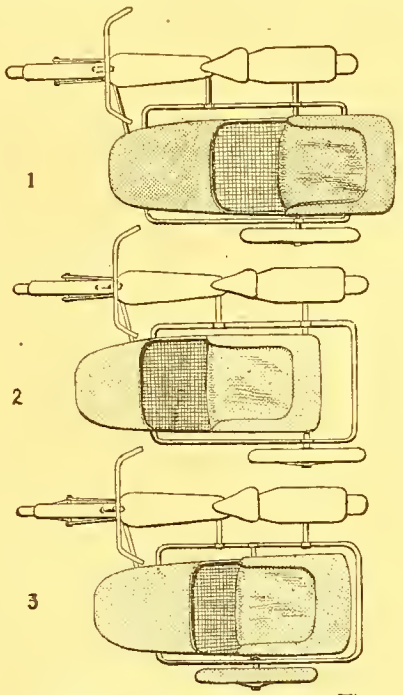
Relation of Body to Chassis.

What held good a decade ago holds good to-day. In fact, the sidecar has been rendered more "unmechanical" by the introduction of the coach-built body and the demand for something more sightly than the old trailer body. One has only to note the position of the modern sidecar body on the chassis to see that, unlike the old trailer, no effort is made to balance the passenger's weight over the axle tube. The position of the body on the majority of modern sidecars is well in front of the axle, therefore the weight is distributed roughly between the three wheels of the combination.

Weight Distribution.

How often do we see a horse in a dogcart bearing the bulk of the weight on its back? It is possible, by moving the sliding seat, to distribute the weight so that the horse carries no weight on its back, the shafts floating in the loops of the harness.

Some of the old trailers were so balanced. Had the weight been all in front of the axle as in modern sidecars, the connecting member would not have supported the load. Undoubtedly the demand for sporting bodies has been partly responsible for makers shifting the location of the body to a position in front of the axle, and the position of the body was not altered back again when this was permitted by the introduction of the dropped axle tube. Consequently chassis have to be made to support more weight than is necessary.



Sidecar body disposition: 1. The passenger weight balanced over the axle, which places the occupant of the sidecar to the rear of the driver. 2. The more conventional position with the body in front of the axle. 3. A compromise between 1 and 2, retaining the sociable position of the body but locating the axle beneath it by moving the sidecar wheel forward.

By redistributing the weight to bring it over the axle tube, such things as the fourth point of connection would not be necessary, and half the tubes in some chassis could be dispensed with.

The Advantage of Reliable Data.

It would be interesting to place a fully-loaded sidecar combination on a weighbridge and have the weight of each wheel ascertained separately, and the three weights again obtained when the passenger and body weight had been balanced over the axle. I think the weights on the front wheel of the machine would show a startling difference.

One has to remember that weight that is not balanced acts as a dead weight when the machine is in motion, and, with the roads in the condition they are likely to be for some time to come, this dead weight will be a more serious item than before the war.

With the body directly over the axle tube, the position of the passenger is not so companionable as the more conventional position level with the driver, and it becomes an open question whether it would not be better to move the sidecar wheel further forward. Is there any reason why this should not be done? Perhaps if the weight were distributed between a triangle formed by the wheels, sidecar mechanism would line up more with the engineer's ideas of sound principles.

A Suggestion.

It would be interesting if sidecar designers would come forward with a few "reasons" for present-day design. In justice to themselves they should not allow the motor cycling world to assume that such questions as these have not been considered. At all other points of motor cycle design designers can give reasons for their introduction. Can sidecar makers give any reason why no attempt is made to balance the weight carried by the sidecar chassis?

Perhaps half the fractures of motor cycle frames, especially those at the head and front down tube, are due to the dead weight upon them. At present the load is carried on all three wheels; by balancing the weight over the axle tube, the load would be distributed between the rear wheel of the cycle and the sidecar wheel. Which is the better? VEDETTE.

MILITARY NOTES.

Honours for Motor Cyclists. London-Edinburgh Trial for 1919?

RESETTLEMENT OF MILITARY MEN.

THE Minister of Reconstruction desires it to be known that enquiries regarding demobilisation and resettlement of individual officers or men should not be addressed to the Ministry of Reconstruction. Any such communications should be sent to the Controller-General of Civil Demobilisation and Resettlement, Ministry of Labour, Whitehall Gardens, S.W.1.

HARD LUCK.

WE have received a letter from Mr. Fred Dover, who, it will be remembered, rode round the coast of Great Britain on a single-geared Premier, stating that his son, a promising motor cyclist, was seriously wounded on the last day of the war and had to have his leg amputated. It is distinctly hard luck, and we sympathise sincerely with Pte. Dover and his father.

Pte. T. Dover, son of Mr. Fred Dover, of Sheffield, who was wounded in the right arm and lost his right leg on the last day of the war.

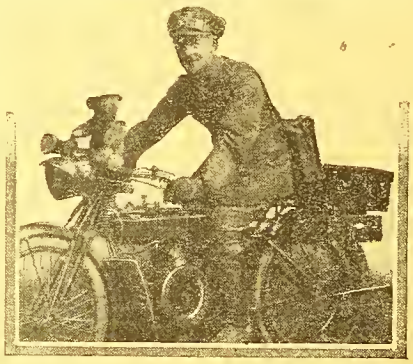
TWO GALLANT MOTOR CYCLISTS.

THE last stages of the great war claimed two brave motor cyclists. Lt. P. E. Buckingham, M.C., R.A.F., who was reported killed on November 8th, had a varied Army career. In 1915 he received his commission, and subsequently served in the Bedford Regt., the Royal West Kent Regt., and the 37th Trench Mortar Battery, with which, on November 1st, 1917, he was awarded the M.C. Last June he joined the R.A.F., as so many other keen motor cyclists have done. His C.O. wrote: "He and his pilot were a most able pair."

Capt. H. M. Maitland, Intelligence Corps, went out to France as a motor cyclist in 1914. He was educated at Marlborough and at Selwyn College, Cambridge, and, besides being a motor cyclist, was a pioneer pilot, having learned to fly in 1910, but his flying career came to an end owing to an accident, in which he was severely injured. He served with great distinction in the Intelligence Corps, and was twice mentioned in despatches. He was also a brilliant journalist. His death was due to pneumonia following influenza. The motor cyclists' Roll of Honour is very long.

MILITARY MEDAL FOR A D.R.

AN interesting presentation took place at Dover recently, when Pte. M. Langley, D.R., R.E., was decorated with the Military Medal for conspicuous bravery in carrying despatches last November between Finns and Marcoing, when his lamp was smashed and his mud-



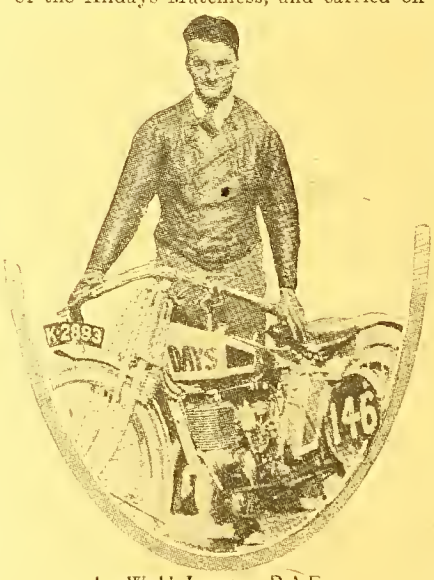
Pte. M. Langley, D.R., R.E.

guards and toolbags hit by bullets at Gouzecourt. He got through with his message despite the fact that the Huns held parts of the road. He has been riding in France for twelve months, but is now working at the base owing to having his eyes affected by gas. He has been using a Douglas, and says he looks forward to riding a similar machine on the good English roads after the war.

FLIGHT COMMANDER LONGTON, R.A.F.

WE learn that Lt. W. H. Longton, R.A.F., well known to motor cyclists as a keen competition rider, has now attained the rank of Flight Commander, having officially seven Hun 'planes to his credit. In the old days Longton was a clever exponent of the Alldays Matchless, and carried off innumerable trophies. In 1914 he joined the Worcestershire Yeomanry, and served in Egypt and Gallipoli for nine months, when he was invalided home. Afterwards he obtained a transfer to the, then, R.F.C., and as instructor and engineer expert delighted crowds at Cramlington and Upavon by his marvellous "stunts."

Flight-Com. Longton is only twenty-six years of age, and is a popular member of the Birmingham Motor Cycle Club. We hope he will be spared to endanger many more motor cycle records in future days.



Lt. W. H. Longton, R.A.F.

1919 COMPETITIONS. SUGGESTIONS BY A WELL-KNOWN RIDER.

WE have just received a letter from W. Cooper, who now holds a commission in the A.S.C., M.T., which he joined in June this year. He is in charge of an M.T. section in Norfolk, and is now riding a countershaft Triumph. He writes: "Why not go all out for the M.C.C. London-Edinburgh at Whitsun?

Lt. W. (Billy) Cooper, A.S.C., M.T., a well-known figure in pre-war competitions.

I am sure it would appeal to many of the boys. I saw Charlesworth the other day, the old Zenith amateur, who is attached to one of the military hospitals in Norwich, and he hopes we shall have some race meetings at Brooklands during 1919. I know that Southend and Westcliffe are very anxious for a speed meeting to take place on the promenade, similar to that organised by the Essex Club during 1914. Why not boom a trial for D.R.'s who have never taken part in a competition? I am prepared to put up a gold medal for the best performance."

We are fully in agreement with most of Mr. Cooper's suggestions, and think that by Whitsun it would be quite possible to organise the London-Edinburgh run, and his idea of a trial for D.R.'s who have never taken part in a motor cycle competition is a distinctly good one.

SILVER BADGE FOR "WRENS."

"WRENS" officers and ratings are now allowed to wear the Services Rendered silver badge if discharged for ill-health contracted on naval service.

CURRENT CHAT

SPECIAL FEATURES

CONVERTING A SINGLE-SPEED TO A TWO-SPEED.
A NEW THREE-WHEELER POSITION OF THE SIDECAR BODY.

TIME TO LIGHT LAMPS

GREENWICH TIME.

Dec. 12th	...	...	4.19 p.m.
,, 14th	...	...	4.19 ,,
,, 16th	...	...	4.20 ,,
,, 18th	...	...	4.20 ,,

Aluminium Production in the U.S.A.

While in 1900 the total output of aluminium in the U.S.A. amounted only to 3,250 tons, in 1917 it reached 81,000 tons.

Death of a Motor Cycling Journalist.

Sec.-Lt. T. J. Mander, Indian Army Reserve of Officers, a journalist attached to a well-known London daily, has recently met his death through illness in Mesopotamia. When war broke out he offered himself for enlistment, and was rejected about half a dozen times through bad eyesight. Finally, at the beginning of October, 1914, he was accepted as a motor cyclist despatch rider. He went through the Dardanelles campaign, and had many escapes while riding his motor cycle under fire on the beach. Eventually he proceeded to Egypt and Mesopotamia, where he recently received his commission.

The Scott Courier.

This may possibly be the name chosen for the new Scott three-wheeled car, though nothing definite has yet been arrived at with regard to its christening. The new model, at present undergoing very searching road test, is a great improvement as regards appearances on its predecessor, which we described fully on July 27th, 1916. The machine is now practically noiseless, owing largely to the revisions and perfections that have been made in the lay-out of the transmission and the design of the body, and the present steering is a great advance on the previous model we tested. We hope at a very early date, however, to give our readers full particulars and the results of our personal road test.

Motor Car Licence Duty.

Paragraphs have recently appeared in the daily press in terms similar to the following: "Licences for 1918 are not needed for motor cars used only for election work." This statement is misleading. Section 14 (4) of 46 and 47 Vic. Ch. 51 (the Corrupt and Illegal Practices Prevention Act, 1883) enacts that "No person shall be liable to pay any duty or to take out a licence for any carriage by reason only of such carriage being used without payment or promise of payment for the conveyance of electors to or from the poll at an election." The exemption, therefore, applies only to the use of cars on the day of polling, and not to general use during the period of the election campaign

Gas from Wheat Straw.

A scientist of Saskatchewan, by the manufacture of gas from wheat straw, has been able to run his automobile with satisfactory results.

American D.R.'s and the Douglas.

American D.R.'s have up to the present had very little good to say of the British machines. It is therefore interesting to find at least one of them championing a machine which is a decided anti-type to the usual American ideal. Writing to an American motor cycle paper this D.R. says: "Of all the mounts they hand me is a British 2¼ *(sic)* h.p. flat twin, and when I came over that machine attracted me a lot. Well, now I am riding one, and I will say that they are a tidy little machine—or toy—the darn thing is so tiny. It's one virtue is to hold to a wet road rim deep in mud at 50 per. Damn! if I like those two-speeds without a clutch or starter. I rather like the hand-controlled air valve and those twiddlers that are perched on the bars are not so bad when you get used to them. What anyone sees in the semi-T.T. handle-bars, however, is much more than I can gather. Darn uncomfortable position, I say. Chain-cum-belt drive is comfortable, but what's the idea of a ½in. driving chain from engine to countershaft? I'm in fear that this part of the motor will fly off and get lost in the machinery some fine day."

1919 PRICES.

ARIEL, 3½ h.p.	£80 0 0
,, , 3½ h.p. Sidecar Outfit..	106 0 0
B.S.A., 4½ h.p. Model, with all-chain drive..	81 18 0
B.S.A., 4½ h.p. Model, with chain-cum-belt drive	79 16 0
B.S.A., 4½ h.p. Sidecar	29 9 0
MATCHLESS, 8 h.p. Military Model Combination	140 0 0
TRIUMPH, 4 h.p. W.D. Model	85 0 0

Distance Limit to be Temporarily Suspended.

From December 16th to January 10th (inclusive) motor vehicles may be used for any purpose without limitation of distance. No additional petrol will be provided.

Indians in U.S. Service.

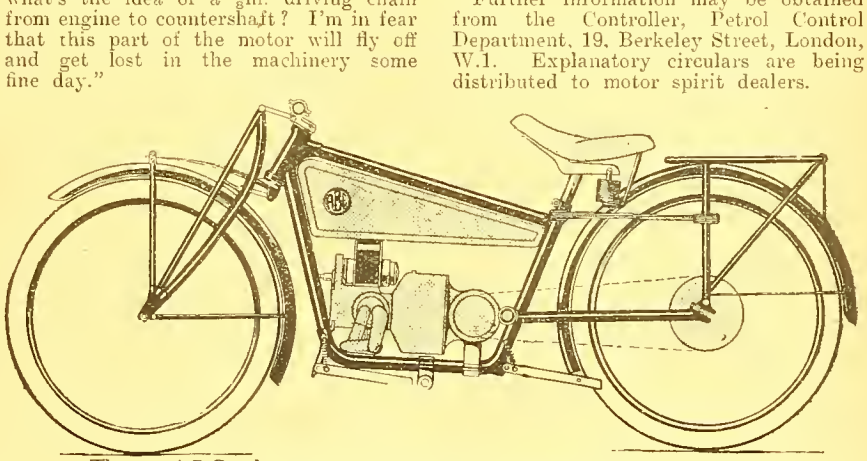
For the year ended August 31st, 1918, the Hendee Co. was awarded U.S. Government contracts for 13,000 machines of the total of 22,500 ordered from all concerns, while 1918-19 contracts were for 45,000, of which 27,000 were to be Indian, 75% of which were to be fitted with sidecars. With the signing of the Armistice, the makers were released from the bulk of the contracts, which permits them to divert their supplies into civil channels.

Release of Benzole—50% Concession.

Considerable quantities of benzole are now available, and the ordinary motor spirit licences can be used for the purchase of benzole as well as petrol. After January 1st the Petrol Control Department will be prepared to issue special supplementary licences available for the purchase of benzole only. These special licences will authorise the purchase of a quantity of benzole exceeding by 50% the quantity of petrol which would have been allocated on an ordinary motor spirit licence. Licence holders should state whether they desire the supplementary allowance to be granted on an ordinary motor spirit licence or on a special benzole licence, and they will be given the option of converting their original licences, wholly or in part, available for benzole only.

New applicants may apply for either an ordinary motor spirit licence or a special licence for the purchase of benzole only.

Further information may be obtained from the Controller, Petrol Control Department, 19, Berkeley Street, London, W.1. Explanatory circulars are being distributed to motor spirit dealers.



The new A.B.C. solo machine with opposed twin engine placed across the frame and epicyclic three-speed gear in the flywheel.

The British Motor Cycle Racing Club.

It is hoped to revive the B.M.C.R.C. at an early date. Old members should therefore communicate with the secretary, Mr. T. W. Loughborough, 83, Pall Mall, London, S.W.1, as soon as possible.

A Proposed Motor Cycle Club.

A motor cycle and sidecar club is in course of formation in Hull. Local motor cyclists are requested to communicate with Mr. Fred Hall, 1, Margaret Street, Hull.

Sheffield Motor Cycle Agency.

We hear that "Dan" Bradbury, for many years a most successful exponent of Norton motor cycles, is opening a motor cycle depot in Sheffield after the war, with agencies for the Norton, Sun-Vitesse, and other makes.

The Disposal of Army Vehicles.

Several of our readers have written to us asking as to what will happen to the numerous Army motor cycles which will be no longer needed by the military. At the present moment we are unable to give any definite reply. So far as the R.A.F. is concerned, it is not anticipated that any motor cycles will be available. With regard to the A.S.C. motor cycles, and practically all other motor vehicles used by the Army, these will be dealt with by the Ministry of Supply.

Obituary.

We regret to record the death of Mr. J. S. V. Bickford, B.A., the author of "Faults and How to Find Them." Readers of our handbook "Tracing Troubles" will doubtless remember that in the preface to this latter handbook the author, "Road Rider," mentioned that the manual had been prepared on similar lines to the late Mr. J. S. V. Bickford's automobile manual, "Faults and How to Find Them." Mr. Bickford's death took place suddenly, from heart failure, at Camborne, Cornwall.

War Petrol?

A member of our staff recently encountered a form of trouble which may be very much in evidence in the immediate future. He was getting his machine ready with frantic speed for the Glorious First (which turned out to be the most rain-sodden day of the year, after all), and thought he had everything more or less in shape. But she refused to fire. Not so much as a cough. Three short weeks before she had been running beautifully, but the shed was damp, so he suspected Spanish influenza. None the less, the magneto was all right, and nearly shocked his finger off. Plugs were new rotary aero engine type—like Cæsar's wife, above suspicion. High-tension cables sound, contact breaker (though mended months ago by the roadside with clock spring) never better. Carburetter flooding, jet clear, slides working. Valves moving with orderly precision, tappets clearing.

After an interval, the nature of which is too painful for description, the would-be rider thought to refill his tank, being dubious as to the qualities of war paraffin (polite company directors call it petrol). The little machine, after coughing the old stuff out of her carburetter bowl, went off *à merveille*.

Alcohol-Benzole.

During the war South Africa solved the fuel problem by producing industrial alcohol, which, mixed with 25% to 30% of benzole, made an adequate fuel for use in existing engines, with only one-fifth extra fuel consumption. The alcohol cost 11d. per gallon.

A Motor Cyclist's War Work.

Mr. Fred Dover, the Sheffield rider, has had a busy time during the war. For the first nine months he was a special constable (motor cycle section), guarding the reservoirs during the night. When this force was disbanded, he joined the Sheffield Fire Brigade as a volunteer, and is still a member. Mr. Dover filled in his time driving an ambulance for the 3rd Great Northern Hospital and for convoys of wounded soldiers, but, still finding a little spare time, he is acting as auxiliary tram driver.

A Use for Old Files.

A Swiss ironmongery journal suggests that files which are made of the best crucible steel and no longer serviceable for their original purpose may, with very little alteration in form, find new uses in another category of tools. Flat files of all sizes may be sharpened and used as chisels, while triangular files may be easily converted to centre-bits. The average file needs but little labour expended on it to make it into an efficient screwdriver. Though not always necessary, it may be desirable to grind the face of the file smooth merely for the sake of appearance. In most cases it will be necessary to untemper the steel in order to make the change of form easy. For this, heat to a dull red and allow to cool slowly. When formed, the new cutting edge may be again hardened to suit the use for which it is intended.

Woolwich Club Meeting Called.

Members of the Woolwich, Plumstead, and District M.C.C. have received notice by postcard requesting their presence at a special meeting, to take place at the Woolwich headquarters, the Shakespeare Hotel, to discuss the position of the club and next season's programme. Mr. Ross (captain of the club) informed one of our correspondents that there is a strong feeling amongst the members to start active operations as early as possible, and a "victory" competition is already mooted.

Old Friends are Best.

A correspondent writes in almost lyrical praise on the virtues of old and well-tried machines. "My 'bus and I," he says, "know each other like man and wife. Better—for devil a Benedick do I know who hasn't a few surprises lying in ambush for him, and I think my little mount has emptied her Pandora box of naughtiness. We know precisely the angle at which we dare hit a corner, we know our pulling-up distance at all speeds, at forty miles an hour we are happy and contented, and all movements of control have become sub-conscious. When we are in a tight place I can never remember in sequence what I did, but we wriggle out. She will do anything for a light pressure of the knee; handle-bars are needless excrescences with her. Grease we negotiate with respect, moving delicately, like Agag, and if she is going to skid she will tell me about a yard or so before, the result being that we have never been right down, though we have accomplished outside forward brackets which would make a skater envious. How any sane man can get a new mount every season or so I cannot conceive. Mine's a 1912, and will do me two more seasons!"

Meriden Cross, one of the several "centres of England" to be found in the county of Warwickshire. The Enfield lightweight has been in daily use for nearly five years and not once has the rider been held up on the road. This is not an unusual experience, but illustrates once more the reliability of the modern motor cycle.

THE PREMIER RUNABOUT.

First Particulars of a New Three-wheeler.

AS already announced in previous issues, Coventry Premier, Ltd., have decided to concentrate upon a runabout type of passenger machine. We are now in a position to give some of the details and illustrations of this interesting proposition, which, we are told, is to be a "super" runabout.

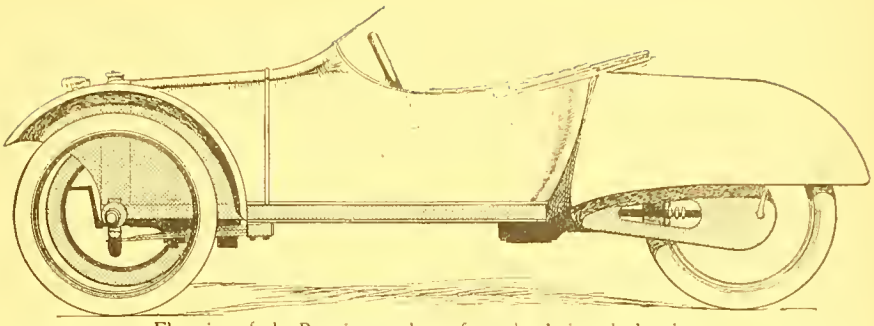
As the term "runabout" suggests, the new Premier machine is a three-wheeler, but a slightly more ambitious three-wheeler than has been marketed before without merging into a class where it would deserve the doubtful appellation "a three-wheeled car." The final chain drive and its small size are sufficient to prevent it coming into the latter class, but at every other point it closely follows car practice. The extreme height of the body is only a little over 3ft. from the ground, which fact gives some idea of the proportions of the little vehicle.

The wheelbase is 7ft. 6in., while the track is 4ft. Quarter-elliptic springs are used all round, those at the rear being inclined and connected to the yoke member of the wheel frame near the top. The rear springing is shown in one of the illustrations, which, being taken from the patent specification mentioned in our issue for October 31st, shows the principle only. The gear box shown in no way resembles the unit fitted to the runabout.

Three Speeds and Reverse.

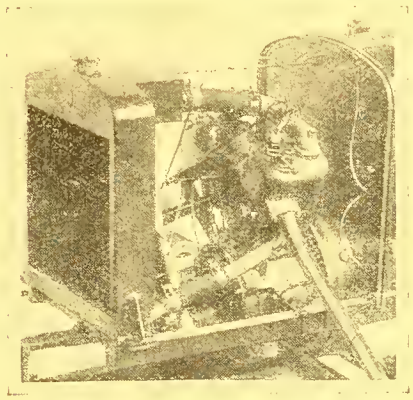
The gear box is of the conventional selective type, and provides three speeds and reverse, the latter being somewhat of an innovation on three-wheelers, but undoubtedly is a point which will be appreciated by owners of such machines, especially those of the fair sex, who cannot be expected to reverse by manual power.

The transmission is by shaft to the gear box, thence by a single chain which is totally enclosed. The chain is easily adjustable by a patented device employing eccentric sheaves, which constitutes the pivot about which the forward end of the wheel frame swings while the chain case remains undisturbed. The rear wheel is quickly detachable, the transmission and brakes being undisturbed. Two brakes are fitted on the rear wheel, and are of the internal expanding type operated by hand and foot independently.



Elevation of the Premier runabout, from the designer's drawings.

The engine, which has been designed specially for this runabout is an 8-10 h.p. water-cooled V twin with the cylinders



The 8-10 h.p. twin engine in an experimental chassis.

set at 50°. The bore and stroke are 80 and 105 mm. respectively, the total capacity being 1,055 c.c. The lubrication is by forced feed, mechanically operated, a large sump being embodied in the crank case. We may say we have seen this engine at work in an experimental frame, and were very favourably impressed by its quiet running and the demonstration of its power. It is remarkably free of mechanical noises with which we had come to associate this type of engine before the war, and if the transmission is as quiet—and there is no reason why it should not be—then the Premier runabout will be as silent as the average car.

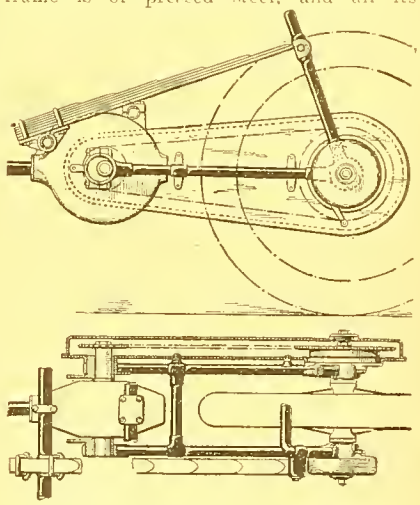
Car practice is being followed in the carburetter and ignition controls, the former being by foot accelerator and the latter by lever on the steering wheel.

Wire wheels will be fitted, shod with 700 × 65 mm. tyres on the front and 700 × 80 on the rear wheel.

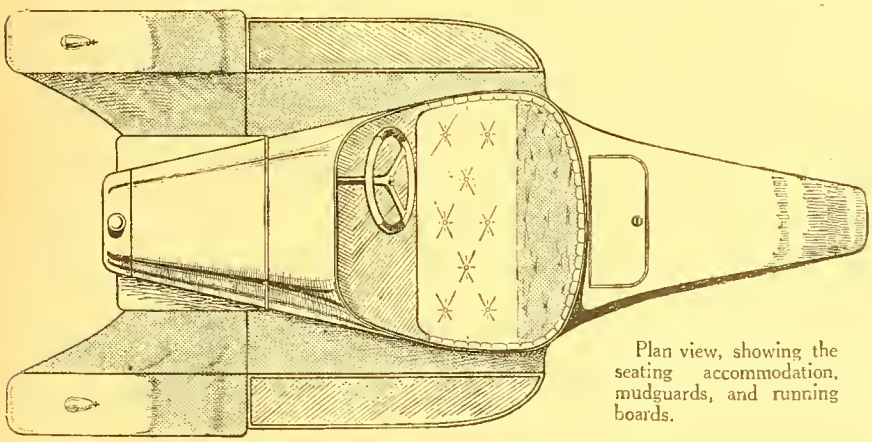
Accommodation and Accessories.

Examination of the drawings of this machine reveals a very close attention to detail.

Provision is made for the fitting of a dynamo lighting set if required. The frame is of pressed steel, and all its subsidiary members are neatly designed. The cooling is by thermo-syphon and the radiator will be of a pleasing design. The roomy two-seated body is extended over the rear wheel to form a guard, and wide front wings are fitted, together with running boards of sufficient width to accommodate a suit case if desired. At the rear of the seats a small locker will be provided. The runabout will be ready for the market in the spring, and although the price has not yet been decided, it is not anticipated that this will be unduly high, considering the very complete nature of the standard equipment, which will include lamps, horn, tool-kit, hood, and screen.



The Premier patented method of adjusting the driving chain and the method of springing the rear wheel.



Plan view, showing the seating accommodation, mudguards, and running boards.

MORE PEACE PROGRAMMES.

EARLY DELIVERY OF ARIELS.

FOR the immediate future Messrs. Ariel Works, Ltd., will only be in a position to deliver one model, viz., their existing 3½ h.p. single-cylinder, either as a solo mount or complete as a combination. A little later they anticipate being able to complete a limited number of their 5-6 h.p. twin-cylinder models. The price of the 3½ h.p. model motor bicycle is £80, and the sidecar outfit £106; luggage carrier, 30s. A copy of the current catalogue will be sent to anyone interested.

THE TYLER PEACE-TIME PROGRAMME.

The Tyler Apparatus Co., Ltd., have entered into a working arrangement with the Metro Manufacturing and Engineering Co., and are fitting Metro engines exclusively to their 1919 models.

Three types will be placed upon the market—the T.T., the touring, and the ladies' motor bicycle.

The address of the Tyler Apparatus Co., Ltd., is Bannister Road, Kilburn Lane, North Kensington, London, W.10.

1919 INDIANS.

For the present the energies of the Hendee Co. will be devoted to the production of the 7 h.p. Powerplus for sidecar work and the little flat twin for solo riding.

THE 1919 RADCO.

Messrs. E. A. Radnall and Co., the makers of the Radco motor cycle, will be ready in the early spring with a new model, which will include several improvements. Owing to the state of the material and labour markets, it is not possible as yet to quote a definite price. The firm, however, are keeping all enquiries before them until they are in a position to quote their clients and give full particulars of the new model.

AN A.C. CYCLE CAR.

The peacetime programme of Messrs. Auto Carriers, Ltd., of Thames Ditton, besides their new light car, includes a new model which will be of interest to motor cyclists and potential buyers of cycle cars. The well-known A.C. Sociable will be abandoned and a little four-wheel cycle car will take its place. On pre-war basis, this Bantam, as it will be called, is a "£100" proposition, but owing to the present unsettled state of the labour and material and market the price cannot be announced. It will be a "popular" one, however. The specification includes a 10 h.p. water-cooled flat twin engine, shaft drive, wheel steering, and two-seater body. But, as it is not anticipated that the vehicle will be ready for the market until late in the summer, the company is not yet ready to deal with enquiries or correspondence regarding it.

THE DESPATCH RIDERS' CLUB.

IN last week's issue we referred to the Despatch Riders' Club, the organisation of which is making excellent progress. We have received a communication from Despatch Rider G. A. Cade, R.E., brother of the well-known motor cycle correspondent, Mr. Lawrence Cade. He informs us that the objects of the club will be many, and it will be generally the means of perpetuating the comradeship of motor cyclists who have been R.E. despatch riders. Many firm friendships have been made in the Service, and to be fellow-members of the club will serve to bind that friendly spirit in an even closer degree.

The temporary honorary secretary has received many useful suggestions from prospective members, and more would be welcomed. One of the best was received lately from an artificer R.E., whose idea is to perpetuate, by means of a challenge cup to be called the Despatch Riders' Trophy, which should be competed for during the Six Days Trials, the memory of those D.R.'s who have fallen.

An interesting letter has been received from Mr. T. W. Loughborough, secretary of the Auto Cycle Union, in which he expresses very kindly and encouraging sentiments, and hopes that the D.R.'s Club will become affiliated to the A.C.U., especially in view of the fact that the elections to the A.C.U. Committee will take place next March. Mr. Loughborough offers the hon. secretary all possible assistance in forming the proposed club, and giving his advice and suggestions in regard to rules regulating its constitution.

Communications concerning the club should be addressed to the Temporary Hon. Secretary, Signal Service Despatch Riders' Club, R.E. Depot, Wellingborough.

Capt. How (on left), who for four years has been training despatch riders. He has always taken a lively interest in their welfare, and has accepted the presidency (provisional) of the Despatch Riders' Club.

NOTES ON THE REFERENDUM.

SOME remarkable facts have come to light in scheduling the "Which Type" forms that have poured in from all over the kingdom. Fully 99% of the forms sent in are straightforward specifications such as any maker can follow. There are several items for which the voting is as overwhelming as it would have been in favour of the magneto had we included the choice of magneto or battery igntion. But there are, however, many who appear to favour nothing in the way of a departure from pre-war practice. Altogether we can promise our readers some extremely interesting data a little later on.

THE MOTOR CYCLE

AVIATION SECTION

Extension of Service in R.A.F. Some More R.A.F. V.C.'s.

R.A.F. Officers' Uniforms.

As from January 1st, all new R.A.F. uniforms must be made of blue cloth.

—◇□◇—

Business Flight by Founder of Royal Aero Club.

Mr. Frank Hedges Butler, founder of the Royal Aero Club, is travelling to France by aeroplane for his firm.

—◇□◇—

A Test of Nerve.

For sheer *panache* (untranslatable—it means "swank," but such swank as a gentleman could permit himself), as for sheer gallantry, Guynemer, the "Ace of Aces," was unapproachable. One day the shells were bursting thick around him. "Do me the favour, my dear lieutenant," says he to his observer, "to photograph these projectiles as they explode!" Feeling a trifle on edge, one day he went up with the idea of testing his nerve. To this end he sat, an unresisting target in the skies, deliberately letting a Boche fire some hundreds of rounds at him without reply! After a while he felt satisfied, and swooped on the Hun like a gerfalcon. Hardly worth while telling the end of that German.

Aerial Germicides.

A correspondent to a provincial daily newspaper mentions that it has occurred to him that the employment of aeroplanes flying at different altitudes and fitted with pumps spraying powerful disinfectants might arrest the "flu."

—◇□◇—

R.A.F.—Extension of Service.

To provide airmen for Overseas garrisons and the necessary reserves at home, it has been decided that airmen may extend their service for periods of approximately two, three, or four years. Those eligible are men serving on "duration of war" engagements, or whose term of Colour service has expired, or is due to expire before April 1st, 1919. They must not be over thirty-eight years of age. The present ordinary rates of pay and the allowances will continue in force, and the rates of separation allowances will be the same. Bounties of £20, £40, or £50 will be paid to those who extend their service, according to the number of years, and special leave of two or three months will be granted. Preference will be given to single men without dependants, or with dependants drawing low rates of allowances

Commercial Pilot's Pay.

A well-known pilot has been engaged by a leading tourist agency at a salary of £1,000 a year.

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Another R.A.F. V.C.

Another airman awarded the V.C. is Lt. (Acting-Capt.) A. W. Beauchamp-Proctor, D.S.O., M.C., D.F.C., No. 84 Squadron, R.A.F. He has fifty-four victories to his credit.

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Major W. G. Barker, V.C., D.S.O., M.C.

Major W. G. Barker, whose encounter with sixty enemy planes has been called the greatest individual feat of the war, has been awarded the Victoria Cross. He already holds the M.C. with two bars and the D.S.O. with one bar.

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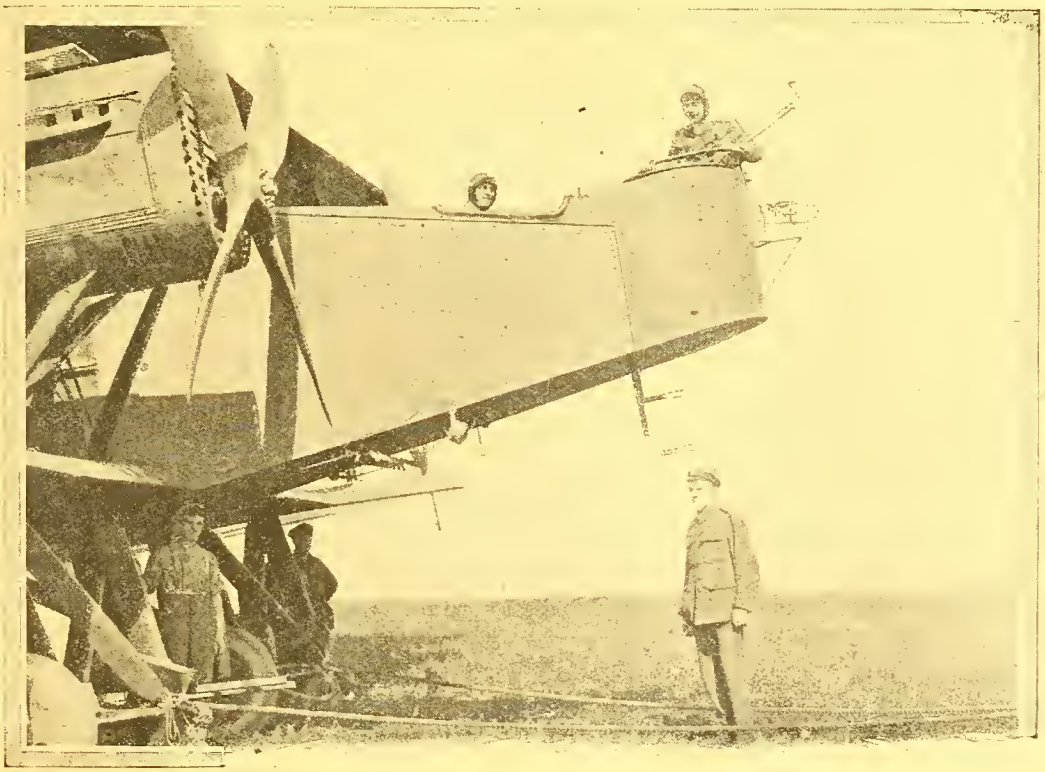
North Africa to Asia by Aeroplane.

During a three days' trip in a Handley Page aeroplane, Maj.-Gen. J. L. Salmond, accompanied by four other British airmen, visited Egypt, Syria, and Mesopotamia, a distance of 780 miles. Although not a long-distance record, the feat demonstrates that the aeroplane has formed a link between Africa and Asia.



EXPRESSES OF THE FUTURE.

A big Handley Page that was used for bombing purposes in France. This type of aeroplane will, no doubt, be used for long distance passenger carrying, both for military and civilian purposes. Already a regular service has been arranged between England and France, and express services of much greater distance, probably to Egypt and India, will be amongst the first journeys to be undertaken regularly.

IN present-day flying the use of the instruments is something of a compromise. Their function is not nearly so clear-cut, so highly-defined, as some people might imagine. The whole range of aircraft, from smallest fighter to giant bomber, is replete with many indicator dials, yet these most necessary gadgets have distinct limitations. They have not yet reached that state of finality which their users might wish, and which will be essential to the much-talked-of forthcoming 'plane of commerce.

The Help of the Horizon.

Ever since the conclusion of the first—instrumentless—lap of aviation progress, the pilot has been favoured by a gradual increase in the number of indicators tacked to his dashboard, yet, this notwithstanding, the trust that can be placed in them under certain conditions is slight.

A scout pilot aims to fly his machine for the most part by sight and his own judgment, leaving the navigation instruments as much as possible to take care of themselves. It is when possibilities of this convenient "sight" are removed that he turns in desperation to the dashboard dials, and it is then on the cards that much may happen. Cloud-flying is fraught with uncertainty, and whenever possible should be avoided. Under the most favourable conditions a pilot inexperienced of such things may before long find himself in a fix; while if it is a gusty, bumpy day the expert is no better off.

Lack of a guiding horizon is the trouble, and the instruments are not wholly capable of atoning for its absence.

The Limitations of Instruments.

Although cloudy, our pilot pushes up through the mist in the hope of quickly coming out into bright sunshine beyond. He ascends, as he thinks, on a steady incline, depending on his air-speed indicator for amount of climb, and on his compass to give him his direction in a straight line. So far, so well, and but for the wind factor the experienced flier would no doubt come through eventless. But a gust strikes the machine and alters its course, which is recorded by the compass. The result as seen by the pilot is that the machine is still behaving perfectly as it should do, and that the compass is aimlessly swinging. Knowing otherwise, however, he moves his rudder-bar and attempts to get the compass back into its right position—which usually results in over-correction and the card's swinging right round in the opposite direction. Probably he is not now even on an even keel, but the level, always influenced by centrifugal force, is useless to tell him of it. If banked at over 45°, inversion of controls has—quite unknown to the pilot—occurred, and whatever he may do it will be next to impossible to pick up his course once more. During these attempts further complications set in. To the novice, the air-speed indicator as well as the compass would appear to have failed.

Having lost all knowledge of the machine's behaviour in the air, he has no indicator on board that will enlighten him as to the true state of affairs.

Eventually the matter is solved for him by his emergence from the clouds in a spinning nose-dive, nearly upside down, or in some other unusual position. Except in the first case, he easily gets his 'bus in hand again; provided he has sufficient height, there is no special difficulty even in the first; if he hasn't——!

This example certainly effectually shows the limitations of air-instruments, and until these limitations are removed—as in course of time they inevitably will be—flying can never be really safe. Nothing has yet been said of the other side of the picture. To the instrument maker's credit may be placed the aviation compass, the latest type of which is a splendid example of difficulties ingeniously overcome.

Interconnection.

In connection with instruments there is a peculiarity of interest to everyone, and not without its utility. What I may term "interconnection" has its practical aspect in the event of an instrument's failure while in flight. By a process of deduction from other instruments' tellings the loss may be to a great extent neutralised. To a pilot knowing the usual level flying speed of his machine, the air-speed indicator is a perfect source for the information as to dive and climb; while, as a natural converse, the fore-and-aft level will, if necessary, serve as some sort of air-speed indicator, the engine giving its normal power throughout. Again, a good idea can be obtained from the air-speed and height combined as to the running of the engine. Having the speed a machine is doing and its variations in height, engine performance follows naturally.

Pilots and a Medical Flight.

It requires a certain temperament, certain distinctive psychological characteristics, to make a good pilot. The classification of these characteristics has been the subject of exhaustive study and investigation by the medical service of the R.A.F., and it has been found that in some cases men of perfect physique failed as pilots. A special "medical flight" has, therefore, been formed, where such pilots work under medical supervision, the causes of their failure are ascertained, and, wherever possible, remedied. LEADING EDGE.

Post-war Improvements in Aviation.

Some Requirements of the Aeroplane for Peace Time Flying.

PEOPLE who talk of the huge risks which aviators undergo in modern machines, and platitudinously remark that we have a great deal to learn before aviation becomes reliable enough to be of universal commercial use, are apt to overlook the fact that all our aeronautical genius has been turned towards the production of war machines. And war machines and commercial machines will differ as much as the proverbial chalk and cheese.

Aeroplanes designed for war work aim at performing three functions—speed, climb, and power of manœuvre. For technical reasons, these three qualities are depreciated by any attempt at extra strength, stability, or reliability. Hence the designer adopts a *via media* increasing speed and climb somewhat at the expense of his margin of safety, though leaving the latter sufficiently high to make the machine safe in most emergencies. It is, of course, a point to his advantage that he is not handicapped by questions of economy to the extent that a competitive, commercial producer will be in the future.

Increasing the Angle of Incidence.

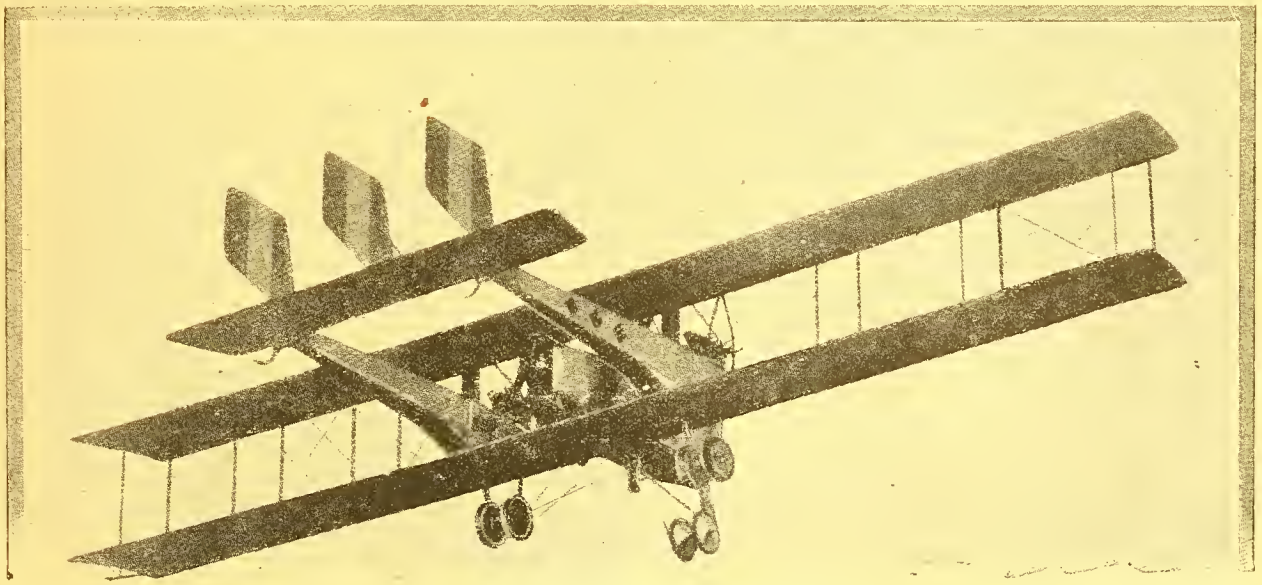
One of the many drawbacks of the present-day machine lies in its inability to fly at low speeds. Technically expressed, its stalling point is comparatively high. This defect has the unfortunate result of compelling the aviator to take off and land at fairly high speeds, thus increasing the area in which it is possible to come to rest. This difficulty, of course, could be circumvented by having a very low stalling point. But a low stalling point means increased angle of incidence or camber, which in turn means increased drift. And as speed can be expressed as lift-drift ratio, we should lose our first essential.

The obvious remedy, then, is to have some method of altering the aerofoils or the main plane angle of incidence while in the air. The idea is not entirely new. In several types of two-seater machines at the present-day, the angle of incidence of the tail-plane is alterable to allow for different weights in the passenger's cockpit and to facilitate landing. But with additional variable incidence on the main planes, the advantages would be still greater. A pilot could adjust his planes so as to take off at a speed of, perhaps, two or three miles per hour. With a constant thrust from the engine good climb could be obtained, and the line of flight would be a steep incline. Once in the air, the planes could be adjusted with less angle of incidence, the result being an increase of forward speed.

Other Problems Introduced.

The main advantage, however, would be in the possibility of slow landings. With the planes adjusted to their maximum angle, the machine could land at abnormally slow speeds, nor would the gliding angle be too low. Thus the area of the landing ground could be considerably decreased.

Provided, however, that these suggested improvements are put into practice, we are at once confronted with a new difficulty. As the speed of the machine varies, so the revolutions of the propeller will tend to become higher. This tendency would result in "over-revving" on the part of the engine. There are two possible solutions of the difficulty. One method would be a system of gears interposed between the engine and the propeller. A second possibility is that of variable propeller pitch. Both these systems present difficulties. The disadvantage of the first suggestion lies in the tremendous strain which would be thrown on any system of gears working with such a high-revving engine as is common in machines of to-day—though there is, strictly speaking, no reason



An American Caproni biplane in flight.

Post-war Improvements in Aviation.—

why a comparatively low-revving engine should not be used and the propeller-speed geared up as required. The mechanical contrivance necessary to secure variation of propeller pitch would be highly complicated, and as such rather unreliable. Probably the only method would be the turning of the blades bodily from the boss, each blade being a detachable and separate feature.

It is not absolutely necessary, however, that variable propeller speed should be attained. If the engine revolutions are normal when the planes are trimmed for maximum speed, then the only occasion upon which the engine will waste power through propeller slip will be immediately on taking off. Once out of the aerodrome and above ground obstacles, the planes can be adjusted for greater speed and the machine made to climb in the usual manner.

The carrying out of these methods would imply extra working parts, and, consequently, increased weight and expense. But from a commercial standpoint it is questionable whether these considerations will outweigh the decided advantages which would accrue from such an improvement.

The Development of Aerial Fighting.

By RIMO.

IT is a fact now generally admitted that on the outbreak of hostilities the Royal Flying Corps had very few serviceable aeroplanes, and the small number which comprised the first squadron which went to France were not suitable for war flying.

The aeroplanes of the first squadron were composed of three separate types—viz., two-seater "pusher" biplanes, two-seater tractor biplanes, and single-seater monoplanes. The *personnel* of these machines was a number of exceptionally brave aviators, many of whom had been interested in aviation from its infancy. The work of the aviators in the early days of the war mostly comprised aerial reconnaissance, and this was carried out under exceedingly difficult circumstances. In the first instance, both British and enemy troops fired upon every aeroplane which was seen, quite irrespective of nationality. This may not sound very dangerous in the present days of flying, when a machine can reach an altitude of 20,000 feet or more, but in 1914 the maximum altitude was very much less than that. Another adverse condition to which the British aviators had to accustom themselves was the continual changing of landing grounds, owing to the rapid advance of the German forces.

The Evolution of Armament.

The question of how to fight enemy aircraft when encountered was a point which received a good deal of consideration. The aviators took up rifles, revolvers, and small bombs or hand grenades, with which to fight, and some indecisive combats took place between British and enemy machines.

This method of fighting continued for a period, and then machine guns were fitted to the aeroplanes. But, owing to the vast number of different control wires, bracing wires, and struts, and the peculiar construction of the machines, the field of fire was very small.

On the "pusher" two-seater machines a movable machine-gun was fitted, as was also done in the case of the "pusher" single-seaters, which had just come on active service. On the tractor two-seater machines a fixed machine-gun was fitted, so fixed as only to fire at right angles to the aeroplane. In the case of one tractor machine, four guns were fitted. With so many guns as this the head resistance, or drag, must have been considerably increased, thereby decreasing the speed of the machine.

The pilots of the single-seater "pusher" machines soon found that they could not control the aeroplane and fire a movable gun at the same time. Therefore, a number of them worked out their best firing angle, and fixed the guns accordingly. This necessitated pointing the machine at the target.

At this time the French fitted a fixed machine-gun to their tractor machines which was able to fire through the propeller. To prevent bullets damaging the propeller, steel deflectors were fixed, which so considerably reduced the power that the idea had to be given up. Very soon after this came the period which was known as the "Fokker Scourge." The Germans brought out a very fast machine, which had a fixed machine-gun, worked by a synchronising gear, firing through the propeller. This machine was built especially for speed work and fighting purposes, only carrying enough petrol to last for about half an hour. The Fokkers would climb to a great height and watch for one of our reconnaissance machines some distance below. On sighting one they would dive, and take up a position under the tail of the British aeroplane, and fire bursts of bullets into it. This position was—and is, even now—a vantage point, as the observer in front of the hunted machine could not fire behind, and the pilot had not a gun to fire even if he could have let the controls alone to do so. Should there have been a gun which could be fired behind, the machine under the tail could not be hit, because of the tail group being in the line of fire. The only method of defence for our machines was to keep dodging and get nose on to the enemy.

This state of affairs continued till formation flying on a small scale began. The reconnaissance machine would complete its observations whilst two others would watch for enemy machines.

At last the British brought out a fast single-seater tractor biplane armed with a fixed machine-gun firing through the propeller, and we began to combat the enemy aviators. The two-seaters were rearranged, the pilot changing places with the observer, which made a great difference. The pilot had a fixed gun firing through the propeller, and the observer was armed with a swivel gun which had a large field of fire.

With proper armament, and good machines, the British organised regular patrols; two-seater machines were utilised for reconnaissance, bombing, and photography purposes, and single-seaters, patrolled the lines, protecting our two-seaters, and attacking German aircraft in the vicinity. In this manner was aerial fighting developed to the present-day standard of efficiency and reliability.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

GALVANISING

Sir,—I am no rider, and take in your journal for its reading, but I am quite sure that a galvanised motor cycle would never stand the strain, as the pickling process takes all the nature out of the iron. J. NORRIS.

PETROL FOR CHRISTMAS.

Sir,—I have been wondering whether the Petrol Committee would release a small quantity of petrol during Christmas week without licence. There is bound to be a congestion on the railways during this period, and if the Petrol Committee would favourably consider this suggestion I think it would greatly relieve the inevitable overcrowding.

Northwich. SUGGESTION.

BENZOLE.

Sir,—I have read with interest your articles upon benzole, and the way you keep bringing it forward to the notice of the motor unions and public generally. I can inform you confidently that benzole is being well looked after, and that if the patent I have in hand only comes through successfully, and those interested in the matter will only come forward at the right time, petrol will have to go out of its way a little (in price) to push benzole off the market. I am sorry I cannot enlighten you further, as Dora is rather an expensive lady, but will do so at the earliest opportunity.

MOTORIST.

THE T.T. IN 1919.

Sir,—In your Leader of December 5th dealing with "The Competitions of 1919," you dismiss the probability of a T.T. race, as "it must be held early in the summer, before the Isle of Man becomes too crowded." May I be allowed to point out that there is no possibility of the island becomiug crowded next summer, on account of the lack of transport? It is well known that the cream of the Manx passenger fleet was commandeered by the Admiralty, and that most of the boats have been sunk or bought outright. Those remaining have been so altered, I believe, that it will take some time to refit them for their original purpose. This is not likely to be done in time for the "season," as the traffic to the Isle of Man will be treated as a luxury trade.

After four years of war the motor cycle trade would be ill-advised to scratch this event for 1919, as it is the best world-wide advertisement the British motor cycle has.

May we Manx people hope that you, sir, will use your great influence to agitate for a T.T. race next September, and so benefit both the trade and the people of the most beautiful island in the world? P. W. HAMPTON,

MAJOR R.A.M.C.

STEAM MOTOR CYCLES.

Sir,—As your correspondent "Steam" mentions in his letter of December 5th, a steam cycle design appearing in the *Model Engineer* (a summary of which you recently published), for which I was responsible, and questions the capability of the engine to perform the intended work on account of the (in his estimation) unduly small cylinders, I shall be glad to have the opportunity of explaining my point of view.

In the original article the power was estimated at 4 b.h.p., but a higher power could be obtained temporarily. Now, "Steam" does not believe these "cylinders" to be capable of even average power. I have understood 4 h.p. to be an "average" power for motor cycle work; but, as the much abused small cylinders in question could easily exert 10 *brake* h.p., *if supplied with the necessary steam*, it is quite apparent that your correspondent is labouring under a misunderstanding.

"Steam," despite his pseudonym, overlooks the fact that with a steam plant the power is determined by the evaporative capability of the steam generator; and that the volumetrical capacity of the engine cylinders per unit time, together with the initial steam pressure and cut-off, decides the output of the engine, and not merely the size of the cylinders alone.

If "Steam" troubles to enquire further he will find that those big cylinders he mentions are coupled almost directly to the rear wheels. In the case of the Doble and the Stanley cars the reduction is 47 to 49, I believe. It is evident that if the engine runs faster (in proportion to the rear wheels) by lowering the gear, the sizes of the cylinders may be reduced without affecting the power one way or another.

In the case of Mr. Taylor's steam cycle, the inability to attain a higher speed than 25 m.p.h. was due to (1) the type of engine which had practically full stroke admission, and thus no economy by steam expansion; and (2) the incapability of the boiler to supply sufficient steam to the above wasteful engine at a higher speed than 25 m.p.h.

I do not wish the above remarks to be taken as deprecating Mr. Taylor's work, which has undoubtedly great experimental value.

May I direct attention to the Correspondence column of the *Model Engineer*, where the "heavyweight" design of steam cycle is being discussed. THOS. HINDLE.

Sir,—I am sure many of your readers must have been most interested in the description of Mr. Hindle's design for a steam cycle in your issue of October 24th. As you say, this is a great advance on previous designs, and seems to indicate that if, when motor cycle manufacturers get busy on supplies for the public, petrol still remains at a high price, the steam cycle may have a golden opportunity to prove itself: although, to judge from the steam omnibuses running in this district, maintenance costs, due to road vibration upsetting pipe joints, may be somewhat high, and the power plant would have to be cased in with detachable sheets lined with asbestos, as a leaking steam pipe with superheated steam at 500 lb. per square inch would *not* be comfortable between one's legs! However, that is perhaps carping criticism of the steam cycle in general, and not of this design in particular.

I should be glad if Mr. Hindle would be so kind as to enlighten me on the following points of his design:

(1.) What type of feed pump does he propose to employ, and how driven? (Is it similar to the fuel pump?)

(2.) How is the condensed water dealt with? Is it merely run into a hot well, from which it is drawn by feed-pump suction? How is water fed from the tank?

(3.) The details of the automatic control of the burner on so small a scale would be interesting, as I should imagine its usefulness would be threatened by its delicacy.

(4.) How is lubrication of the engine effected?

(5.) Has any method been provided for getting rid of condensed steam in the cylinders when starting up from cold?

In going over the above points, solutions of all except query No. 3 suggested themselves to me, although No. 4 is not, as far as I can see at present, surmounted easily as regards both simplicity and efficiency—neglecting the "splash" method, which is obviously not used here.

East Dulwich. SAPPER SUB.

A CURIOUS CASE.

Sir,—I have had an experience similar to that of "D.R., Mesopotamia," losing a brush on a wet tarred road. I remember thinking, as I removed this, that I must not drop it, and sure enough I did. A few moments' thought brought to my mind a tip given in your paper, viz., a small piece of lead pencil shaped as the brush and fitted in its place. This answered admirably, and took me ten miles, and would have done more, but, taking no risks, I put in the proper fitment at the earliest opportunity.

To my mind, the letters and tips in your columns are particularly interesting. SUTTONEER.

Sir,—In reference to the correspondence in recent issues of your esteemed paper regarding the "curious" behaviour of magnetos firing regularly whilst being minus a high-tension carbon brush, I think it is easily explained.

The construction of the ebonite brush holder is such that a brass tube moulded in it, containing the carbon brush, reaches to within 1 mm. of the collector ring. Should the brush be missing, and the magneto in ordinary condition as regards strength of magnets, contact breaker correctly set, etc., one will easily get two sparks in series, across slip ring to the brass tube and across the plug, except at very low speeds.

There is, in fact, a four-cylinder magneto on the market, without carbon brushes in the high-tension distributer, the rotating member having only clearance from the four studs to the different cylinders. MATT. PATTERSON.

PRICES.

Sir,—May I claim a little space in your valuable paper to speak of a matter which I feel will need altering if the motor cycle trade of England is to prosper.

On opening *The Motor Cycle* recently I received a shock to find that a certain outfit which was to be bought any time within the last nine months for the sum of £120 is now advertised at £140, and this without so much as a lamp—just the bare outfit *plus* spare wheel.

Now, I plump for the British outfit every time, and I may say I have owned quite a dozen, also I am about to purchase a new one when I can get delivery, but if British firms adopt measures of the kind stated—well, I must look elsewhere.

I can find no reason for a rise in price now. Surely both labour and material must have been harder to obtain while we were at war than now. DISGUSTED.

THINK IMPERIALLY.

Sir,—I have just read your Peace number, with its note of manufacturing revival. May I make one suggestion to British designers, namely, to think Imperially?

I landed in England two months ago, after sixteen months in Africa, for thirteen of which I was in charge of motor transport in the German East campaign. I have also seen the motoring conditions in British East and South Africa. It is no exaggeration to say that the vast majority of cars and motor cycles in these countries are American. The reason is that they suit the conditions, and spares are obtainable.

I have heard that the British designer's contention is that the model he can sell in the United Kingdom is unsuitable for Overseas, and that the Overseas type is unsaleable here, and that success lies in specialising on one model. In my opinion, this argument is sheer tosh. To refute it, I will instance two makes: *(a)* the B.S.A. motor cycle and *(b)* the Ford car.

(a.) I have never owned or driven a B.S.A., but no one will deny its popularity at home. In British East it forms about 75% of all the British motor bicycles I saw. The South Africans swear by it for those who are content with a 4 h.p. single. All our despatch riders were mounted on it in G.E.A. Now, it is topographically impossible to have a more severe test than these despatch riders gave their mounts. We had no roads. When the road corps had cut down enough trees to let us get through the bush, we went ahead. In a day we had cut the surface a foot or so deep in dust. We had ascents and declines and precipices and dry river beds such as no home rider ever dreams of. The despatch rider carried his kit, rifle or revolver, ammunition, and food. I have never seen one broken down on the road. One gathers, therefore, that the one model Home and Overseas motor bicycle is not impossible.

(b.) I have had charge of some hundreds of Fords in G.E.A. We had hardly any spares, and the workshop proposition was more or less non-existent up the line. One simply could not get travelling shops over the "roads" in the early days of our advance. Casualties from sickness were terribly heavy among the men, and reinforcements were few, so that the drivers were often people one would not trust with a mangle in the ordinary way. I used to go from car to car giving driving lessons on the road. Nevertheless we got there with our Fords. My corporal and I did all our running repairs ourselves, so you can guess how much overhauling forty odd cars got. Our beat was one hundred miles a day. Fords are undeniably common and satisfactory at home also.

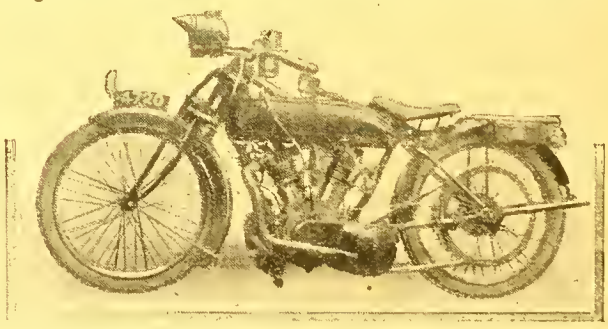
I think this proves that one model for many countries is feasible. Personally, I drove one Ford in G.E.A. 4,000 miles, and it frequently did the last twenty miles of the day on low gear in order to light home the convoy, as mine was the only car with any lights.

Now, sir, except the Flying Corps vehicles, whose mileage was very small, and a few old British lorries attached to the heavy artillery, all the motor transport in the 1917 operations in G.E.A.—at any rate, on the eastern side, where the main operations took place—was done with American cars. These were standard models, such as are used in the States and Europe. All made good under impossible conditions of road, load, and treatment. I had to do with practically every make we had, and if I had to choose a car for personal use in Africa to-morrow I should be indifferent which one I chose.

I do not say English cars could not have done the work, but I do say American cars did do it. And there are certain features of American cars indispensable in Africa. Some of these are:

1. Plenty of engine power, giving great flexibility on top gear. You cannot always be changing down and up on bad African tracks. You want both hands on the wheel as much as possible.
2. Plenty of road clearance under axles, running boards, etc. African roads wear into two deep wheel ruts with a sort of embankment between them. If your axles will not clear the embankment, you stay fast.
3. Big tyres and an extra leaf or two in the springs.
4. Big oil and juice capacity and a cooling system that will not boil every five minutes. You do not strike water every mile or so.
5. Finally, a big powerful car, like the 1916 Hup, or the big Overland, with that elasticity and absence of minute adjustment American cars have. A scrape-the-ground with a watch mechanism is no good. It takes a strong man and a tough stodgy car with no nerves to stand Overseas conditions.

There is a very big African market for British motor goods, but the people are no sentimentalists. They will buy the British article if it will do the work as well as or better than the American at the same price, and *if spares are available in plenty in the country.* American spares are, but I have heard woeful tales of a motor bicycle being laid up for months while the owner begged for a vital part from England. M.T. SUBALTERN.



An 8 h.p. J.A.P. engined motor bicycle assembled by George Stillwell and Parry, Melbourne, the property of Mr. Eric H. Gardner, of Port Melbourne, Victoria, Australia. It is fitted with an 8 h.p. overhead valve J.A.P. engine, and equipped with a countershaft gear box, combined chain and belt drive, and 28in. wheels. The machine averages sixty-five miles to the gallon.

CYCLE CARS.

Sir,—I own a small three-wheeled cycle car very much after the style of the Scott Sociable. My 'bus is called the Seal, and I may say that I have had this machine since August, 1916, when I bought it new.

A better little machine for all weathers one could not possibly ask for. Roughly speaking, I may say that it always starts easily the whole year round. No petrol is ever injected into the cylinders. On the level I can do 45 m.p.h., and have never come across a hill I cannot negotiate. The clutch and gear box are equal to those of a first-class car.

One fault is that the three springs which support the body are hardly strong enough, and it should be fitted with detachable wheels; also the lighting set (acetylene) is not satisfactory.

Why I am wasting your time telling you all this is that there has been a large controversy in your paper about cycle cars being unreliable, and also that motor bicycles and sidecars are the ideal, save that the driver has no comfort.

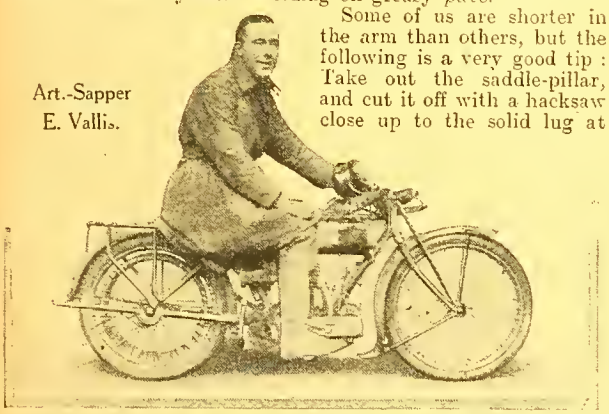
It seems to me that the Seal fills the gap completely except for the points I have mentioned, which need improving.

W. MUSGRAVE HOYLE, CAPT.

GADGETS THAT TELL.

Sir,—My machine holds the road well in grease and on corners, so I will take this opportunity of giving a few hints and tips which may be of a little use to others.

The first point to watch in your machine for grease riding is to see that your weight is equally distributed on the machine, and that you can sit up and "let her have her head." To sit on a machine crouched over the tank and gripping the handle-bars with the same grip as one would use on a tyre lever "in putting an undersize cover on a rim" is absolutely fatal if riding on greasy *pavé*.



Art.-Sapper E. Vallis.

Some of us are shorter in the arm than others, but the following is a very good tip: Take out the saddle-pillar, and cut it off with a hacksaw close up to the solid lug at the shoulder; then cut off the smaller piece, also close up, and drive the 1in. tube into the 1¼in. tube, and replace pillar. It is then possible to fit the saddle on to a vertical pin, and you are closer to the handle-bars.

The bars should be fitted to the very bottom of the stem, and there you have perfect control of your machine. A pair of Pedley pneumatic grips, finally covered with a piece of ordinary inner tube, takes away the vibration.

Now a word or two on different gadgets: First, the lamp is placed well back, because one can easily hold a map in front of it at night to find out the road; it is also possible to place your hands on it to warm them a little when the night air is cold. Furthermore, I think it looks much neater than being set up so high in the air. Working on a swivel, it is possible to direct the rays upon the front tyre if one is unfortunate enough to have a puncture.

The generator is placed under the saddle on the down tube, the gas being conveyed by a piece of copper [Brass is better.—ED.] tubing to a container—simply the bulb of a horn. This acts as a water catcher, and also puts a great pressure of gas behind the burner.

The carburetter is a standard Triumph, with a trumpet sweated on. Close behind the cylinder is fitted a metal cup, leading to a piece of 1½in. rubber tube (both cup and tube are off a gas mask). This tube enters the trumpet, and therefore conveys hot air to the carburetter, which is a great help in vaporising the "petrol" we get here.

The exhaust pipe is a piece of a German Gotha which was brought down on Whit-Sunday night. It originally conveyed the water from the radiator to the cylinder heads of the big Mercédès engine. It still has the rubber joint on the end, and gives the exhaust a lovely tone.

I have also fitted a heel-operated trigger to the clutch, which, used in conjunction with the handle-bar control, lengthens the life of a clutch cable considerably.

A Douglas fork spring is fitted, which stops the action of backlash which is experienced on the ordinary Triumph spring after passing over a pot-hole, if used by itself.

Before fitting this a broken barrel spring was the only trouble to look forward to, but since fitting it I have never had one break, and it has been in use several months now.

I might add, in fairness to the Triumph firm, that the roads out here are much worse than was ever expected, and that its product is the "last word" as regards a motor cycle. I might add that I have no axe to grind, and will wish all my pals *au revoir* and hope soon to meet at Brooklands, the Wisley Hut, or the Stonebridge Hotel.

ARTIFICER-SAPPER E. VALLIS.

LEAKAGE OF MAGNETISM.

Sir,—*Re* Mr. Chapman's letter on leakage of magnetism in Dixie magnetos. May I be permitted to make a few corrections. Mr. Chapman states that "Here you have a roller which *alternately* passes the flux through itself." By "roller" I take it Mr. Chapman means the rotating pole member. Now in the Dixie magneto there is no reversal of magnetic flux in the rotating pole members, as these rotate adjacent to their respective poles the whole time, with only a very small gap between the magnet poles and themselves, and that for all practical purposes they may be considered as rotating extensions of the magnet poles. I think that Mr. Chapman does not take into account the peculiar position of the magnets in the Dixie magneto, which are fitted directly opposite to the magnets in the rotating armature type. That under certain conditions the Dixie will not give satisfactory results I quite agree, but after successfully overhauling hundreds of these magnetos I can at least assure Mr. Chapman that he has not yet located its peculiarity. Further, I would ask him how he accounts for other makes of rotating pole magnetos operating as successfully as the rotating armature type without non-magnetic driving wheels.

SGT. 274 (M.T.) CO.

Sir,—Having noticed readers' letters *re* leakage of magnetism in the Dixie magneto, also that Mr. Chapman states that this is a positive fact, I have no doubt many readers whose machines are fitted with the Dixie will be rather uneasy. I should therefore like to give *my* experience. In December, 1915, I purchased a 3½ h.p. Sunbeam fitted with this magneto, and have never had one moment's trouble with the ignition. The machine has been stored since last November, but I can start it up from dead cold on first or second kick, and it will tick over or roar away without the ghost of a misfire. It is quite true the rotor spindle and driving sprocket are strongly magnetised, and also the spindle, cam, screws, etc., at the contact breaker side, but I fail to see how the magnetic flux can leak away *viâ* chains or wheels, seeing that an easier path is provided for flux, viz., through the rotor shoes and laminated field. If I might venture a suggestion, the trouble is more likely to arise from the condenser, which, being in a more exposed position on this magneto than in most, might suffer from damp. But this is easily detached, and putting it in a warm place for an hour or so would restore its efficiency.

M. CLAYTON.

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A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Petrol Permits.

I have sold my motor cycle combination which I wish to drive to the purchaser. I have a little petrol. Please tell me: (1.) If I can drive it without a special permit from the Petrol Controller? (2.) Shall I have to pay the local taxation licence? (3.) What is the Petrol Controller's address?—G.W.G.

(1.) Yes, if the distance does not exceed ten miles, and you obtain a permit from your local chief of police. (2.) If you have not a local taxation licence and use the machine at all, you become liable for this. (3.) The Petrol Controller's Department is 19, Berkeley Street, W.1.

A Case for the S.P.C.M.C.

I recently purchased a 1915 2½ h.p. New Imperial-Jap, and took it out for a trial on a track far from the police. It ascended a tough hill from cold on bottom gear with ease, and then did seven or eight miles on the level without a hitch. I then had to return to the house to have the tank filled with petrol. This time it refused to ascend the hill, and on the level went for a few hundred yards and then stopped with a "plonk, plonk," which noise it continued to make when being pushed rapidly along. I took out the sparking plug and rotated the back wheel rapidly, but no spark crossed the gap, but I felt the shock in my arm when I caught hold of the end of the wire. Do you think this would account for the trouble, or could you suggest any other cause? The carburetter appeared to be working all right, and the compression is good. The engine also refuses to work when the gear—an Albion—is changed from low to high, but works when changed from high to low. Can you please suggest a remedy for this? I should also like to know what system of lubrication is employed on this machine, as I can only see a pump fitted in the tank, and do not understand how it acts.—W.E.J.

It is obvious that the trouble with your machine is lubrication. No motor cycle will run without a regular supply of lubricant, and the pump in your tank is for supplying the necessary oil to the engine. A pumpful should be given once every ten miles at most, while if the engine happens to be dry three or four pumpfuls should be given before it is started. We should imagine from what you say that by running the engine without lubricant you have seriously damaged it, and it would be as well to have it taken down and thoroughly examined by a mechanic before you attempt to use it again.

Fitting a Hot Air Device.

I have been making a little alteration to the feed pipe for the petrol on my motor cycle, and cannot get it to work satisfactorily owing to air locks. I have a long length of piping, which I have wound in two complete turns round the rear cylinder, starting from the connection under the tank, round the top of the cylinder, and gradually working down to the bottom and then to the carburetter. Do you think an air lock is caused through too much heat, as I notice it more when I have been running a few miles? If I open the engine out at all it is not long before it stops firing. After stopping a few minutes it will start again. The air vent in the filler cap is quite clear. Do you think if I started from the lowest point first in the winding instead of the top, or do you think one turn would give more satisfaction than the two? I would like to have your advice on the matter before experimenting any more with the pipe.—R.D.

The device you have made should be quite satisfactory if you are using heavy fuel. The trouble, of course, may be due to the carburetter requiring more air now the fuel is heated, or to the fact that you are using a plug of an unsuitable kind, which causes pre-ignition, and this would account for the symptoms from which your engine is suffering. The petrol pipe appears to be wound round the cylinder quite correctly; but perhaps, as you suggest, the fuel gets too warm and evaporates, causing an "air" lock, and one turn would suffice.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication.

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Renovating a Wicker Body.

Please tell me the most satisfactory way to renovate a wicker sidecar body. I have a model A1 Gloria wicker sidecar body, and after constant use in bad weather it has had all the varnish washed off. Would you advise me to revarnish it, or would you enamel it, say, in dark grey or another colour?—J.T.H.

First of all wash down the wicker sidecar body and remove all grit, allow it to become thoroughly dry, and then you can either revarnish it or enamel it in any colour you please with such enamel as Robbialac or Velure. Apply the colour very thinly and give several coats.

How to Start Easily.

I have recently purchased a 6 h.p. Rex motor cycle, and am having considerable difficulty in starting. I would, therefore, like a few tips. It is a two-speed gear and free engine. (Roc gear handle start.) Would you give me the best position for the levers, etc.? It is in perfect order, but I do not seem to get an easy start.—H.W.

Close the air, open the throttle halfway, advance the spark fully, flood the carburetter well, and, if necessary, push a piece of rag into the main air intake of the carburetter, and withdraw it the moment the engine has started.

RECOMMENDED ROUTES.

DERBY TO BLACKPOOL.—T.H.

Derby, Ashbourne, Leek, Congleton, Northwich, Warrington, Newton, Wigan, Preston, Kirkham, Blackpool. Approximately 120 miles.

SUDBURY TO BRIGHTON.—L.A.J.

Sudbury, Halstead, Braintree, Chelmsford, Billericay, Horndon-on-the-Hill, Tilbury, by ferry to Gravesend, Meopham, Wrotham, Ightham, Tonbridge, Tunbridge Wells, Crowborough, Uckfield, Little Horsted, Lewes, Brighton.

CHATHAM TO PORTSMOUTH.—G.J.J.

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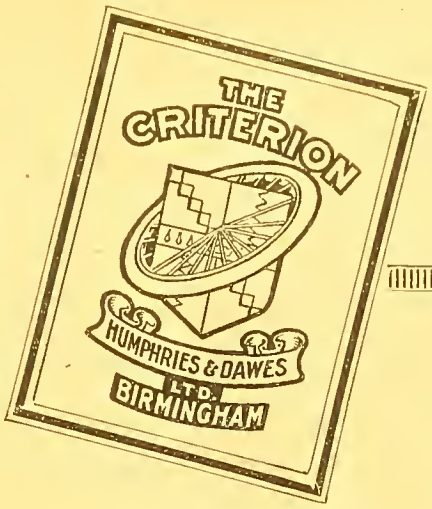

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CALTHORPE-J.A.P. 4-5 h.p. twin Combination	£81 0
B.S.A., 4½ h.p., 3-speed, chain-cum-belt	£81 0
JAMES 4½ h.p. 3-speed Combination	£99 0
JAMES 5-6 h.p. 3-speed Combination	£104 0
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JUNO-J.A.P., 4 h.p., Sturmey 3-speed countershaft	72 gns.
ROVER, 3½ h.p., 3-speed, clutch, kick-start	£83 0

Selection from Second-hand stock.

A.J.S., 1916, 2¾ h.p., 3-speed, clutch, kick-start	57 gns.
ARIEL, 1916, military model, 3½ h.p., 3-speed	62 gns.
BAT-J.A.P. 1915 6 h.p. 3-speed countershaft Combination	59 gns.
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ABINGDON KING DICK 1916 6 h.p. 3-speed Combination	89 gns.
CALTHORPE-J.A.P., 1916, 2-speed, clutch	32 gns.
DOUGLAS, 1915, T.T., 2-speed, excellent order	42 gns.
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HUMBER 1918 6-8 h.p. 3-speed water-cooled Combination, fitted spare wheel	89 gns.
HUMBER, 1918, 3½ h.p., flat twin, 3-speed, as new	69 gns.
INDIAN, 1916, Powerplus, 3-speed, clutch, kick-start	72 gns.
INDIAN, 1916, 7-9 h.p., 3-speed, spring-frame, sporting Phœnix underslung coachbuilt Sidecar	85 gns.
INDIAN, 1915, 7-9 h.p., T.T., clutch, as new	45 gns.
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INDIAN, 1915, 7-9 h.p., 3-speed, clutch, kick-start, khaki finish	80 gns.
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ENFIELD Sidecar Combination, 6h.p. twin, 2-speed, free engine, handle starter, coachbuilt sidecar, good as new, powerful touring combination.—Herefordshire Fruit Co., Mansion House, Hereford. [1342

1913 Royal Enfield, 2¾h.p. twin, 2-speed, free engine and kick start, lamps, horn, enamelling and tyres excellent condition; £26; not used since 1915.—Turner, Westbourne House, 95, Richmond Rd., Twickenham. [1412

ENFIELD Combination, 1917 model, purchased late 1916, 6h.p., T.T. handles, Bosch, disc wheels, tyres as new, special sidecar, electric lights, a beautiful and fast combination; no offers, 100 gns.—147, Colony Cottages, Foleshill, Coventry. [X0771

ENFIELD Combination, 6h.p., late 1916, first-class condition, very fast and economical, new tyres, one spare cover and tube, complete with 3 lamps, tools, mat, and apron; any examination; £85.—C.B., 61, Station Rd., Harlesden, N.W.10. [X0183

Excelsior.

3h.p. Excelsior, o.h.i.v. M.M.C. engine, mag., B. and B., low built, good condition and running order; £15.—H.J.H., 48, Swainstone Rd., Reading. [1339

F.N.

F.N., 2¼h.p., 1911, to be sold in parts; Bosch magneto.—Minihane, Ballydehob, Co. Cork. [X0721

F.N., 4-5h.p., 4-cyl., good condition throughout; £22, or nearest offer.—Holly View, White Rose Lane, Woking. [X0630

Harley-Davidson.

1917 Harley-Davidson Combination, electric model, only ridden a few miles; £120.—Below.

1917 Harley-Davidson Combination, standard model, lamps, horn; £110.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

HARLEY-DAVIDSON, 7-9h.p., early 1917, perfect condition; £79.—Powell, Staff Quarters, Sarkbridge, Gretna. [X0834

1915 Harley-Davidson Combination, in excellent condition, all lamps, etc.; lowest £70.—Hubert Wright, 180, Brearley St., Birmingham. [X0554

HARLEY-DAVIDSON 1916 Combination, 7-9h.p., electric model, Montgomery sidecar, splendid condition; £120.—Apply Box L7,930, c/o *The Motor Cycle*. [1068

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1917 Harley-Davidson Combination, olive green, electric model, new August, 1917, mechanically perfect, speedometer, spare valves, chains, tube, springs, etc., low mileage, sidecar just repainted; any reasonable trial in Midlands; cost over £130, accept £90.—Box L8,083, c/o *The Motor Cycle*. [1302

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1913 Hazlewood-Jap, 2¾h.p., overhauled, Armstrong 3-speed, B. and B., magneto (variable), Millers, new horn, controls, and footrests, not used since 1914; any trial; £22.—Ray, Almshouse, Cornsay, Co. Durham. [X0696

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1914 Hobart, £22/10; also wicker torpedo sidecar, £12.—Clare, 145, Euston Rd., N.W.1. [1248

1916 Hobart-Villiers, 2½h.p., 2-stroke, 2-speed, run on petrol or substitute, new Dunlop tyres, lamps, etc.; £32/10.—25, Arngask Rd., Catford, S.E. [1278

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HUMBER Twin, 2¾h.p.; £20, or exchange with cash for cycle car.—39, Bulwer Rd., Leytonstone. [X0407

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INDIAN.—Early delivery assured by placing your order with Parker's, Bradshawgate, Bolton. [X0869

7h.p. Indian, 1913, good condition, running order; £50.—Wright, 191, Greenstead Rd., Colchester. [X0433

INDIAN, 6h.p., free engine, running order, not used last 2 years; £20.—Talmore, Bury St. Edmund's. [1294

INDIAN, 1915-16, 5-6h.p. 3-speed, kick starter, as new; £54.—Vyse, Ward A1, 3rd London General, Wandsworth. [1469

7-9h.p. Indian Combination, just overhauled, perfect condition, complete; £47.—H., 66, Devonshire Rd., Forest Hill, London, S.E. [X0774

1915 Spring Frame 7-9h.p. Indian, 3 speeds, K.S., clutch, lamps, tools, good tyres, spare chain, etc.; £50.—16, York St., Dover. [1338

7-9h.p. Powerplus Indian and Sidecar, coachbuilt, sporting type, 3 speeds, spring frame; £80.—Wauchope's, 9, Shoe Lane, London. [1323

1915 7-9h.p. Indian, guaranteed thoroughly overhauled, runs equal new; £45; exchanges with pleasure.—Palmer's Garage, Tooting. [9203

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7-9h.p. Indian Motor Cycle, sidecar, 1915, for sale, a bargain, 3 speeds, full set lamps, electric and acetylene, first rate condition.—Apply, 67, George St., Portman Sq., London, W.1. [1066

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J.A.P.

J.A.P., 4h.p. single, 1914, in running order; £26.—J. Sheppard, 19, Ridley Rd., Harlesden, N.W.10. [1374

COACHBUILT Combination, 4h.p. J.A.P. engine, Sturmey-Archer 3-speed, Lucas bead light and horn, in good condition; £45.—Davies, 251, Munition Cottages, Foleshill, Coventry. [X0555

J.E.S.

J.E.S., 1¼h.p., run 200 miles; cost £24; seen any time; offers.—J. R. Wood, Haigh, Barnsley. [X0655

Juno.

NEW Model Junos.—4¼h.p. J.A.P., Sturmey 3-speed countershaft gear, hand clutch, kick-start, 72 gns.; Juno-Villiers, single speed, 2-stroke, 34 gns; no permits.—Rider Troward and Co., 31, High St., Hampstead. [1235

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3½h.p. Kerry-Abingdon, good running order, new Dunlop tyre on back wheel; £23.—Parker and Son, St. Ives, Hunts. [1472

Lea-Francis.

1914 Lea-Francis, 3¼h.p., 2 speeds, kick starter, and all appointments; £45.—Apply, Doctor Rose, Horwich, Lancashire. [X0826

Levis.

1914 Levis, 2-speed model; £25.—Wauchope's, 9, Shoe Lane, London. [1325

1915 Levis, 2¾h.p., 2 speeds, in fine order; £27.—Cross, Jeweller, Rotherham. [X0821

LEVIS, 2¼h.p., 1916, as new; 20 gns.—H., 66, Devonshire Rd., Forest Hill, London, S.E. [X0773

LEVIS, 2½h.p., 2-speed model, new August, 1918, and hardly used, Enk starter, lamps, unpunctured.—Sage, Minster Precincts, Peterborough. [X0421

1915 Levis, 2¼h.p., just overhauled, new Dunlop studded tyres, horn, Amac, drip feed; £20.—H. Maclean, H.M.S. Royal Sovereign, c/o G.P.O. [X0824

LEVIS, 2½h.p., 2 speeds, complete with lamps, etc., machine new last August, not done 800 miles; £40.—Apply, Halling, Salters Lane, near Redditch, Worcestershire. [X0804

LEVIS.—For the earliest possible delivery of 1919 models, advance specifications of all models, sole district agents, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0127

Matchless.

MATCHLESS War Model Combination, new; owner cannot use; reasonable cash offer accepted.—Box L8,063, c/o *The Motor Cycle* [1300

MATCHLESS.—Immediate delivery from stock latest combinations with spare wheel; £140; exchanges.—Parker's, Bradshawgate, Bolton. [X0866

MATCHLESS War Model Combination, with spare wheel and tyre; £140; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [9345

MATCHLESS Combination, 1914, 8h.p. M.A.G. engine, 3-speed, good condition; price £80; seen by appointment.—Rogers, 106, Fulham Palace Rd., W.6. [1257

MATCHLESS.—Immediate delivery war model combination, spare wheel and tyre; £125; no permits.—Rider Troward and Co., 31, High St., Hampstead. [1236

DELIVERY from stock of the new Victory model Matchless combination, with spare wheel; £140.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0491

1918 Matchless Combination, complete, spare wheel, screen, Lucas accessories, run 10 miles only; £135, cost £150.—Short, 485, Upper Richmond Rd., East Sheen. [1406

8h.p. Matchless Combination, 2 speeds, clutch, kick starter, wind screen, speedometer, lamps, etc.; seen London; splendid condition; £40.—Webber, Craven Cottage, Westgate. [X0562

8h.p. Matchless-Jap, 1915, very little run since purchased from Colliers, Matchless variable gear, T.T. track model; accept £37/10.—Cpl. Wright, Wireless Station, Devizes. [1382

MATCHLESS 1916 Combination, 8h.p. M.A.G. engine, 3-speed, kick start, electric light, speedometer, horn, etc., little used, like new.—Hackney, Warlingham, Surrey. 'Phone: Purley 470. [1392

MATCHLESS.—Special contracting agents for post-war Matchless models; earliest deliveries; exchanges and easy payments arranged.—Maudes', 100, Gt. Portland St., London, W.1. [9920

MATCHLESS, 1913, 8-10h.p. J.A.P., B. and B., Bosch, 2-speed, 1918 sidecar, underslung, screen, lamps, horn, speedometer, overhauled, enamelled, tyres perfect, condition faultless; £50, no offers; bought car.—Klitz, Lymington, Hants. [1279

Minerva.

3¾h.p. Minerva, torpedo tank, spring forks, 26in. wheels, low and racy; 12 gns.—234, Brixton Rd., S.W.9. [1454

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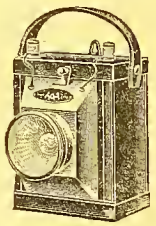

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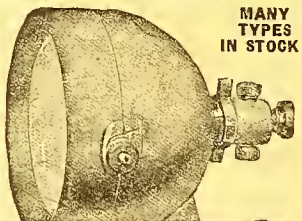

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2½h.p. Motosacoche, new tyres, Binks carburetter, variable speed, first-class lamp; £12.—F.B.S., 14, Connaught Mansions, Coldharbour Lane, Brixton. [1400

New Hudson.

3½h.p. 1914 New Hudson, 3 speeds; 30 gns.—Wauchope's, 9, Shoe Lane, London. [1326

NEW HUDSON, 2¾h.p., Armstrong 3-speed gear, kick-start, clutch, Lucas lamps, lovely little 'bus; £25.—Bunting, Mason's Av., Harrow. [1432

1914 New Hudson Big Six, powerful combination, accessories, electric light, not used 12 months, as new; £75.—Write, Masters, 23, West Hill, Winchester. [X0813

NEW Hudson Combination, 1913, 3-speed, guaranteed perfect, not used since war, tyres good, Rom back; trial run; £32.—Spiceley, Garden Cottage, The Angles, Sheen Lane, S.W. [1361

3½h.p. 3-speed New Hudson, just been renovated, new tyres and belt, good order throughout, exceptionally smart appearance, bargain, £28; nice coach-built sidecar, £6/10.—1a, Richardson Rd., Eccles, Manchester. [X0818

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CROW Bros., Guildford.—New Imperial, all models, new and overhauled second-hands stocked. [9778

NEW Imperials, sole London agents.—2½h.p. 2-speed 1919 models in stock; trade supplied.—Reys, Euston Rd. [1309

NEW Model New Imperials; immediate delivery without permit.—Rider Troward and Co., 31, High St., Hampstead. [1237

NEW Imperial-Jap, 1914, 6h.p. twin, 3-speed, Bosch, good order; bargain, £35; exchanges.—13, Cornwall Mews, Gloucester Rd., S.W.7. [1373

NEW Imperial-Jap, 2-speed model, in first-class condition, very little used; £35; can be seen by appointment.—Apply, O. Windsor, Fernhill, Horley, Surrey. [X0798

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2½h.p. 1916 New Imperial, 2-speed, P. and H. lamps, horn, E.I.C. mag., Senspray, excellent condition, light, fast, economical, easy starter; £33.—140, Denmark Hill, S.E.5. [X0776

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NORTON, 1915 Brooklands special, condition as new.—895, Fulham Rd., S.W. [1273

3½h.p. Norton, T.T. 1915 model; £40; fast machine.—Wauchope's, 9, Shoe Lane, London. [1320

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1913 T.T. 3½h.p. Norton, Philipson pulley, all accessories, guaranteed perfect order; £35.—Irving, 47, Mesnes St., Wigan. [X0817

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NORTONS.—We are now booking orders for the latest model Nortons, solo and sidecar outfits; £5 deposit; deliveries in strictest rotation.—Maudes', 100, Gt. Portland St., London, W.1. [1442

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O.K. Juniors must be booked now if you really want to get there and back every time.—Young's, The Parade, Kilburn, N.W.6. [0967

NEW Model O.K.'s; post-war contract now settled; earliest deliveries; book now.—Rider Troward and Co., 31, High St., Hampstead. [1239

1913 O.K., 2½h.p., 2-speed, chain-cum-belt, in sound running order, new chain and carburetter; £15, or offer.—Rev. Owen, Colyton, Devon. [X0861

P. and M.

P. and M., 3½-4h.p., 2-speed, free engine, and sidecar, splendid order throughout; great bargain, £28/10.—Speechley, 1, Gunnersbury Lane, Acton Hill, London. [1459

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PREMIER, 1914, 3½h.p., 3-speed, perfect running; £26.—Vyse, Ward A1, 3rd London Hospital, Wandsworth. [1260

PREMIER, 1913, 2-speed, free, splendid condition, stored 18 months; £25; evenings.—Clark, 101, Windmill Lane, Deptford, S.E.8. [1366

PREMIER, 3-speed (Armstrong), with adjustable pulley, and Kerry model de luxe sidecar, in splendid condition, and perfect running order; property officer permanently disabled; £45, including all spares and accessories.—87, Braybrooke Rd., Hastings. [1402

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1914 T.T. Rover, stored since January, 1915, all accessories, fast; £38.—Garland, St. John's Rd., Orpington. [1336

1918 (June) 3½h.p. Rover Combination, as new, P and H. lighting set, Lucas horn, tool kit, mileage under 500; first £100, or nearest offer; Ford wanted; exchange considered.—Campbell, Draper, Buntingford. [X0778

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3½h.p. 1916 Rudge Multi and coachbuilt sidecar, practically as new, done about 4,000; 70 gns.—Lee, Axbridge, Som. [X0805

RUDGE, 3½h.p., clutch model, good condition throughout, not used the last two years; £22.—Rose's Garage, Uxbridge. [1354

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TRIUMPH, 3½h.p., 2-speed, Senspray, just overhauled, perfect, with sidecar, £19; Gloria coach sidecar, suit twin, £6, complete.—5, Rossiter Rd., Balham, S.W.12. [1345

TRIUMPH (late 1913), 3-speed, complete with coachbuilt sidecar, in use daily; £50 cash, or part exchange for higher power set or car.—11, Warwick Rd., New Southgate, N.11. [1252

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ZENITH-GRADUA, 1914, clutch, kick starter, Dunlops, speedometer, accessories, in good condition; £37; seen by appointment.—H., 15, Pembroke Rd., South Tottenham. [X0726

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NEW Models. New Models.—Here we are again. First in the field with new models, as we were with spare parts. We have in stock brand new war model 8h.p. Matchless combinations; almost immediate delivery of Ariels, B.S.A., Rovers. If you want your new machine for the coming season, just you come along to Jones' Garage and you will get it. We also have a large number of S.H. first-class models in stock, a few of which are below:

JONES' Garage.—1918 Matchless combination, 8h.p. J.A.P. engines, spare wheel, 700×80 tyres, Victory model; £140; from actual stock.

JONES' Garage.—1914 2-speed Indian, very good condition, sound, reliable machine; bargain, price £42, or with Millford cane sidecar £50; date guaranteed accurate.—Broadway, Muswell Hill.

JONES' Garage.—Late 1915 8h.p. Enfield combination, dynamo lighting, hood, screen, electric horn, etc., all in splendid condition; £94.

JONES' Garage.—1916 B.S.A. combination, Model K, lamps, speedometer, horn, etc., all in fine condition; £67.

JONES' Garage.—1917 Harley, electric model, in the best of condition; £100.

JONES' Garage.—1917 Harley, electric model, with brand new sidecar. A1 lot; £125.

JONES' Garage.—1916 3h.p. Enfield, T.T. bars, quite as good as new; £53.

JONES' Garage.—1915 T.T. 3½h.p. Matchless, mag., De Lister valves, just been re-enamelled by the makers and indistinguishable from new, 2-speed Enfield gear, kick start, new 680×65 tyres; £55.

JONES' Garage have a huge amount of first-class, overhauled, guaranteed, second-hand models, which include A.J.S.'s, Ariels, B.S.A.'s, Douglas, Enfields, Indians, Harleys, Rudges, Rovers, Triumphs, etc.; send for list.—Below.

WHEN you purchase a motor car or motor cycle from Jones' Garage, the date is guaranteed accurate, and we put it upon your receipt, and if any more straightforward methods can be suggested we should be pleased to adopt.—Jones' Garage, Broadway, Muswell Hill, N.10. 'Phone: Hornsey 2562. [7827

SURPLUS Stock; cash offers considered.—1915 A.J.S. combination, £79/10; 3½h.p. 2-speed N.S.U., £19/10; 3½h.p. 2-speed Roach, free engine, £18/10; 5-6h.p. Rudge Multi and coach sidecar, £45; 1913 6h.p. 2-speed Rex and coach sidecar, £39/10; 1914 6h.p. 2-speed Rex, wants attention, £32/10; 2¾h.p. 3-speed Rex, £22/10; 2-speed twin Rex, £18/10; twin m.c.v. Rex, £14/10; 3½h.p. Tourist Triumph, £18/10; 2½h.p. 2-speed Lloyd's-Villiers, £25/10; 1915 Morgan de Luxe, £95; 1914 9.5h.p. Stellite car, 195 gns.; 1914 8h.p. Perry, £125.—Halifax Motor Exchange (new address), 18a, Union St. South, Halifax. [1330

SIDECAR ATTACHMENTS.

RUDGE Coachbuilt Sidecar; 7 gns.—232, Brixton Rd., S.W.9. [1456

LIGHT Sidecar, suit 3½h.p. machine; £3/15.—Celtic Works, East Hill, Wandsworth. [1405

MONTGOMERY Torpedo Coachbuilt, light, suit 3½h.p., perfect; £8, or offer.—Wilson, Lower Daggors, Alderholt, Salisbury. [1397

RENNOC Sidecars are manufactured at the Rennoc Motor Sidecar and Engineering Works, 86, Victoria Rd., Strond Green, London, N.4.

RENNOC Sidecars are designed and manufactured under the personal supervision of Mr. George Conner, 14 years manager to the Phœnix Sidecar Co

RENNOC Sidecars.—We supply lugs, rims, spokes, upholstering material, tubing, springs, and all fitments for any make sidecar.

RENNOC Sidecar Bodies, hoods, screens, etc.; actual manufacturers, wholesale, retail, and export.

RENNOC Sidecars.—We specialise in frame repairs to motor cycle and sidecars.

RENNOC Sidecars.—Special department for sidecar body repairs, repainting, upholstering, lining, etc. Get into communication with our Mr. Conner. It will pay you. [1281

BASTONES' for Sidecars at low prices.—228, Pentonville Rd., King's Cross, London, N.1. [9443

SIDECAR, double-seater, by Purcells, £8/10, good condition.—Hodge, 32, Boston Park Rd., Brentford, Middlesex. [1290

COACHBUILT Sidecar, with screen, smart, £7; wicker sidecar, good order, 30/-.—113, Blair St., Poplar, London. [1384

SPECIAL OFFER THIS WEEK:

LEVIS, 2½ h.p. (latest model).

This machine, which is fitted with a more powerful engine than the Popular Levis, is a most efficient mount.

Our special price, **37 Gns.**

Also the following NEW machines, latest models in stock, all of which can be supplied without a permit:

1918 **MATCHLESS** and Sidecar, complete with spare wheel and tyre	**£140 0**
NEW IMPERIAL-J.A.P., 2½ h.p., 2-speed	**48 gns.**
***LEVIS** Popular, 2-stroke ..	**£32 0**
LEVIS, 2½ h.p., 2-speed ..	**£47/10**
ROVER, 3-sp., kick-starter ..	**£80 0**
ROVER, T.T., Philipson pulley	**£67/10**

SECOND-HAND MACHINES.

1917 **NEW IMPERIAL-J.A.P.**, 2½ h.p., 2-speed	**35 gns.**

*Permit required for this machine.

JULIAN, 84, Broad Street, READING.

'Phone: 1024.

Biggest Light Car and Motor Cycle Dealer in the South.

Closed Wednesday 1.

Enamelling OUTFIT No. 1.

For Motor Cycle and Sidecar.

INCLUDES an ample supply of absolutely everything you need to thoroughly renovate a Motor Cycle and Sidecar. Contents: Sponge, Chamois Leather, Rubbing Felt, Pumice Block, Robbialac Brush, Glass Paper, Cleaning Soda, Pumice Powder, Auto-Stopper, "Rusnoline" Polishing Liquid, Robbialac Thinners, Robbialac Stopping, Mat, Gloss, Transparent; and Instructions. Price 35/-. Carriage extra England and Wales 1/6, Scotland and Ireland 2/-. Full particulars, including large Colour Card, from **Jenson & Nicholson, Ltd., M.C. Outfit Dept., Robbialac Works, Stratford, London, E.15.** Sole manufacturers of

ROBBIALAC

SIDECAR ATTACHMENTS.

SIDECAR, C.B., underslung, nearly new child's seat wind screen, suit 3½h.p.; £11/10.—205, Broad St., Pendleton, Manchester. [X082(

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good selection of second-hand sidecars. A visit would repay you. Also several new Phœnix bodies, sporting and touring. [9448

G.K. Sidecar Co.—'Phone us, Holborn 933, for quotation for renovating your sidecar. New and second-hand sidecars in stock. Hoods, screens, aprons, etc. Reasonable charges.—336, Gray's Inn Rd., W.C.1. [X028(

PHŒNIX Sidecar Bodies, coachbuilt, and enamelled various colours, well sprung both back and front, quick detachable couplings, Palmer or Bates tyres, suitable for engines up to 4h.p.; price £12/12 cash, or 23/4 a month.—Metropolitan Machinists Co., Ltd., 248, Bishopsgate, London, E.C. [1197

MOTOR TRICYCLES.

INVALID'S Motor Tricycle, 1h.p., controlled entirely by hand, easily managed and reliable, grand little turnout; price £65.—Rayner, 12, George St., Blackpool. [X0479

BODIES.

CANE Sidecar Bodies. Several to clear at 50/- each, worth £5; also several juvenile bodies; write for design.—The Willowbrook Co., Leicester. [0901

RENNOC Motor Sidecar and Engineering Works, 86, Victoria Rd., Stroud Green, London, N.4, are actual manufacturers, also have few clearance and second-hand. [1282

BASTONES for Sidecar Bodies.—Several light wicker and coachbuilt bodies; also tandem and torpedo bodies at clearance prices.—228, Pentonville Rd., King's Cross, London, N.1. [9044

SIDECAR Body Designs for the trade only. Working, coloured, pencil, or line drawings of original designs, also working drawings full sized or to scale.—Cooper's Vehicle Journal, Ltd., established designers to the coach trade for over 80 years. Consult us when designing new ideas.—20, Tudor St., London, E.C.4. [0818

HOODS, WIND SCREENS, ETC.

ORTO Wind Screens have no equal in price, design, quality, and workmanship; Ortomatic in action.—Atkinson, 306, Uxbridge Rd., W. [8143

WIND Screens for Sidecarists made to fit any car; send for particulars to actual manufacturers.—Dunn, Milton St., Peterborough. [X0775

RENNOC Motor Sidecar and Engineering Works certainly lead in price, quality, and design of hoods, screens, aprons, etc.—86, Victoria Rd., Strond Green, London, N.4. [1283

RUNABOUTS AND CYCLE CARS.

G.N. Sporting Cycle Car, also Fafnir; exchange motor cycle part payment.—895, Fulham Rd., S.W. [1274

THE Gibbons Cycle Car Co., 106, Harcourt Av., London, E.12.—See advertisement Miscellaneous column. [1437

1914 8h.p. Morgan, lamps, speedometer, etc., perfect condition throughout; £55.—H. Wright, Arlesey, Beds. [1385

1914 Carden Monocar, 6h.p., 2 speeds, splendid condition; £40, or nearest.—H. Wright, Arlesey, Beds. [1386

GRAND Prix Morgan, coupe model, electric lighting, water-cooled, good running order; £125.—Wauchope's, 9, Shoe Lane, London. [1327

RIDER TROWARD and Co. for Morgans, Swift, Phœnix, Sizaire-Naudin, Lagonda, Carden, Bayard, etc., see small advt. under Cars. Exchanges. [9447

CYCLE Car, 2-seater, complete with engine, requires little to finish; a snip, £30, lowest.—Full particulars, Coe, 206, Links Rd., Tooting Junction, S.W.17. [1262

H.S.M. Cycle Car, 2-seater, hood and screen, wheel steering, 8h.p. J.A.P. engine, 3 speeds, chain drive, in perfect condition; £55, or exchange for good solo mount.—31, Camrose St., Plumstead, S.E.18. [1416

CARS FOR SALE.

1913 Alldays 10h.p. 2-cyl. Light Car, 2-seater, electric lights, in perfect condition; any trial; £95; no dealers.—Horrobin, Burnham-on-Crouch. [X0556

12-14h.p. F.I.A.T. Sporting 4-seater, low built, economical to run; exchange motor cycle part payment; £185.—Palmer's Garage, Tooting. [1438

SWIFT 1914 2-seater, in perfect condition and running order, complete with all accessories, hood and screen; £130.—Exeter Motor Cycle and Light Car Co., Ltd., Bath Rd., Exeter. [0958

CROSSLEY, 20-25h.p., 1912, 4-seater, perfect condition, just overhauled, two wind screens, 5 lamps, horn, speedometer, spare wheel, and tools, complete; £150.—R. Letts, Semer Lodge, Ipswich. [1256

10h.p. 2-seater Riley, 2-cyl., 3 speeds, reverse, wire wheels, 700×85, tyres and conchwork as new, wind screen, Cape hood, very fast, 30 m.p.g.; £80; appointment.—200, Church Rd., Willesden. [X0779

CARS FOR SALE.

SEVERAL Light Cars in stock for sale for cash or on our extended payment system, or your motor cycle in exchange; send for list, stating requirements.—Service Co., 292, High Holborn, London, W.C.1. [8735

SPORTING Cars.—Mercedes, 35h.p., reconstructed, 235 gns.; Mercedes, 120h.p., 185 gns.; Isotta-Fraschini, 45h.p., 325 gns.; also 45h.p. Nordenfeldt, 40h.p. Weigel, 40h.p. Oakland (6-cyl.), and 60h.p. Gregoire (6-cyl.).—Below.

MEDIUM Touring Cars.—Briscoe, 15.9h.p., 1917, 195 gns.; Briscoe, 1918, new, £275; Belsize, 1914, 4-seater; Rover, 1911, 4-seater, 59 gns.; R.M.C., 1916, 5-seater, 235 gns.—Below.

LIGHT Cars.—Carden Monocar, 5-6h.p., 55 gns.; Phœnix, 7-9h.p., 69 gns.; Lagonda coupe, C.A.V. dynamo, 149 gns.; Morgan, 1915 Grand Prix, 115 gns.; ditto, 1914, 95 gns.; Morgan, sporting, 1914, 69 gns.; Sizaire-Naudin, 9h.p., 45 gns.; Swift, 1915, 8-10h.p., 119 gns.—Below.

RIDER TROWARD and Co., 31, High St., Hampstead, will undertake exchanges for any of the above, or accept instalments with free storage till after the war. [9446

WAVERLEY 10h.p. Chassis (780×90), artilleries. Henley tyres, heavy brass radiator, 2-speed, reverse, glass wind screen, make grand cycle car; take £15 for the lot; what offers, exchange?—A.E.R., 62, Knighton Park, Sydenham. [1030

STARTLING Announcement. Everybody is putting their prices up! I'm putting mine down! I mean to have your business. That's why I sell six cars a week. Every price in following advertisement reduced. Many of the cars in exceptional condition, and all dates advertised are guaranteed accurate; 6h.p. A.C. box autocarrier, late model, Sankey wheels, watertight mag., worth treble, £22/10; 8-10h.p. Panhard lorry, £32/10; 10h.p. Unique parcels lorry, modern, light car type, wire wheels, pointed radiators, £45; 15h.p. K.R.I.T., torpedo, monobloc, gate, Claudel, detachables, £62/10; 10h.p. Darracq, 2-seater, late model, detachable wire wheels, £68/10; 15h.p. racing car, actual Brooklands winner, 70 m.p.h., streamline skeleton 2-seater, £72/10; 12-16 h.p. Motoblue chassis, unit engine construction, sporty, £77/10; 15h.p. Charron chassis, monobloc, Solex, £77/10; 14-16h.p. Darracq traveller's omnibus, monobloc, gate, Zenith, £82/10; 12-15h.p. Hupmobile, semi-sporting 4-seater, smartly repainted, £88/10; 8-10h.p. 1913 Alldays 2-seater, Zenith, wire wheels, smart, £88/10; 12-16h.p. Star, 2-seater, gate, Zenith, £120 last week, now £90; 2-ton Berliet chassis, twin solids, new gears, Solex, 4 speeds, £90; one Thames bungalow plot at Sunbury, £95, freehold; 8-10h.p. Renault platform lorry, 8ft.×5ft., taxi type chassis, £112/10; 15h.p. Bayard 1-ton van, solids all round, twins behind, £115; 38h.p. Daimler chassis, £115; 30h.p. National sporting 4-seater, £115; 8-10h.p. Humberette, water-cooled, special sporting 2-seater, streamline, disc wheels, £120; 15-25h.p. live axle Panhard chassis, formerly £150, now £120; 12-15h.p. F.I.A.T. taxi-landaulet, monobloc, gate, £125; 12-14h.p. Renault landaulet, £130; 30-40h.p. American 6-cyl. 4-seated speedster, special competition car, worth double, £132/10; 20h.p. 6-cyl. Standard sporting 2-seater, good chassis, but dud body, £132/10; 18h.p. Maxwell streamline 4-seater, monobloc, enclosed valves, £137/10; 2-ton Milnes-Daimler van, live axle, H.T. mag., Zenith, twin solids, £142/10; 38h.p. Wolseley chassis, enclosed valve model, detachable wire wheels, few small parts missing, £175; 2-ton De Dion van, heavy commercial, 15-20h.p. 4-cyl. engine, live axle, twin solids, formerly £275, now £175; 15.9h.p. Arrol-Johnston, torpedo, enclosed valves, detachable Sankey wheels, splendid condition, £182/10; 3-ton Straker-Squire lorry, cab front, twin solids, new tyres, H.T. mag., Zenith, bargain, £235; 1914 Palladium 1-ton van, solids all round, monobloc, enclosed valves, Zenith, £242/10; 20h.p. Crossley, torpedo, monobloc unit construction, Zenith, wire wheels, £247/10; 16-20h.p. Sunbeam chassis, enclosed valves, detachable wheels, 4-speed, Claudel, watertight mag., £250; 13.9h.p. B.S.A., 2-seater, Knight engine, detachable wheels, £265; 3-ton De Dion commercial chassis, latest round radiator type, worm drive, enclosed valves, twin solids, steel wheels, £350; another, with lorry body, complete, £395; 4-ton G.T.C. American platform lorry, platform 13ft.×6ft., believed 1917 model, enclosed valves, centre gate, f.w.d. tractor type, splendid condition, reduced to £425; 2-ton Napier lorry, cab front, twin solids, enclosed valves, steel wheels, £575; 30h.p. 6-cyl. Wolseley ¾ landaulet, enclosed valves, detachable wire wheels, £650; 4½-ton Garner lorry, enclosed valves, twin solids, beautiful condition, bargain, £650.—Douglas S. Cox, the absolutely straight motor man, 6c, Lansdowne Hill, West Norwood, S.E., have all the above actually in stock and on view. Hours 8 to 6.30, including Saturdays. Please call. No business Sundays. Established 1902. [1193

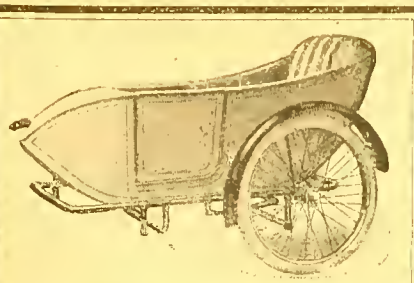
ENGINES.

RIDER TROWARD and Co., 31, High St., Hampstead, have always a good selection of second-hand engines for sale. [9449

GENUINE Bargain.—Ariel engine, 2¾h.p., single, excellent condition, and reliable; £4/10.—Ralph, Rimpton, Bath. [X0863

WAUCHOPE'S, 9, Shoe Lane, Fleet St., London.—3½h.p. horizontal A.B.C. engine, new, including carburetter, magneto, oil feed, and silencer. [1321

4-CYL. Monobloc (w.c.) Chapuis-Dornier Engine, 8-10 h.p., o.h. valves, Zenith carburetter, Bosch DU4 magneto, Saunders air valve fitted; £50; what offers combination for this grand unit; no rubbish entertained.—A.E.R., 62, Knighton Park, Sydenham. [1031



The comfort of a well-sprung Motor Car

is afforded the sidecar passenger when the chassis is made on our new Cantilever principle. This is admittedly the finest chassis on the market, as the spiral springs on each side and at the front eliminate all possibility of shocks.

Send for our Catalogue.

We have produced a supplementary illustrated catalogue dealing exhaustively with this chassis, which should be in the hands of every motorist interested in sidecar combinations.

The Willowbrook Co.,
Willowbrook Works,
Belgrave Gate, Leicester.

Have You Decided
WHERE TO GET YOUR
NEW MOTOR CYCLE?
IF NOT, TRY
JONES' GARAGE,
New Models actually IN STOCK.
And LARGE DELIVERIES of others within a few weeks.

3 MATCHLESS Combinations.
1 ARIEL 3½ h.p. Combination.
2 B.S.A., Model K.
2 IXION 2-strokes.
1 ROVER, T.T.
1 ROVER, 3-speed countershaft.

Deliveries of
A.B.C., Douglas, Enfields New Imperials, O.K.-J.A.P., Triumphs, and **Rudge** expected very soon.

A LARGE SELECTION OF HIGH-CLASS MACHINES IN STOCK.

Also Brand New **Coachbuilt Sidecars,** including double-seaters.

Second-hand Machines consist of: **A.J.S., BRADBURYS, B.S.A., CLYNOS, DOUGLAS, ENFIELDS, HARLEYS, INDIANS, LEVIS, RUDGE, ROVERS, SUNBEAMS, TRIUMPHS,** Etc.

(All dates are accurately given upon receipts.)

JONES' GARAGE,
BROADWAY,
MUSWELL HILL,
LONDON, N.
'Phone—Hornsey, 2562.

ENGINES.

2¾h.p. Ariel Engine, n.o.i.v., B. and B. carburetter, mag., and exhaust pipe, £4; 2¾h.p. horizontal opposed, with carburetter and silencer, incomplete, £3.—Irving, 47, Mesnes St., Wigan. [X0816

IGNITION APPLIANCES.

C.A.V. Clock, single, latest pattern, hardly used; £5.—140, Denmark Hill, S.E.5. [X0777

DIXIE Magneto, clockwise, fixed, suit 2-stroke; 42/-.—Innes, 4, Mount Carmel, Derby. [X0828

SPECIAL Lightweight Magnetos; £3/15.—Service Co., 292, High Holborn, London, W.C.1. [9658

DIXIE Magneto, single, anti-clock, excellent condition; 45/-, quick sale.—Jones, 2, Church Rd., Bradmore, Wolverhampton. (D) [X0788

FOR All Magneto Repairs send to Martin-Craddock, 1, Leyton Rd., Stratford, E.15. All work done by highly skilled workmen. Spares for all types in stock. [9879

JEBRON, registered 291,298, greatly superior to platinum, unequalled for blades, screws, etc.; cures misfiring; 5/- each rivet; Jebron screws, fit Bosch magnetos, 11/- pair; old screws Jebronised, 5/- each.

JEBRON Contacts, used by Messrs. Collier Bros., Colver, Martin, making world's records.—Jebron, 38, Herbert Rd., Woolwich, London, S.E.18. [X4331

FOR Magneto Repairs, spares, re-magnetising, British magnetos and dynamo lighting equipments, write or 'phone Streatham 2108. Established 1900.—Loveland Bros., Crescent Magneto Works, Norbury, London, S.W. [8078

MAGNETO Repairs.—Send your magneto to Palmer's Garage, Tooting. Reply paid; quotation telegraphed on receipt. Quick, efficient repair guaranteed in from 2 to 6 days, usually within 24 hours.—Palmer's Garage, Tooting. [9980

THE Magneto Repairing and Winding Co., Established 1912. Manager S. T. Boon, late from the Bosch works.—Magneto repairs of every description. All repairs at lowest possible prices, and strictly guaranteed. We can mostly return them within 24 hours. We have several new and second-hand single and 2-cyl. magnetos in stock, all guaranteed.—The Magneto Repairing and Winding Co., 158, Seymour St., Euston, N.W.1. 'Phone: Museum 1158. T.A.: Thumagnelec, Norwest, London. [1032

TYRES.

BASTONE'S for Covers and Tubes.—Special clearance lines as below:

BASTONE'S.—26×2 Michelin 10/6, steel stud 20/-.

BASTONE'S.—26×2¼ Michelin Trident 22/-, Hutchinson Brooklands 18/-, Tourist Trophy 25/-, passenger 30/-, Kempshall 19/6, de luxe heavy 30/-.

BASTONE'S.—26×2⅜ Hutchinson T.T. 27/-, passenger 32/-.

BASTONE'S.—26×2½ de luxe heavy 32/-, Gaulois rubber non-skid 18/6, Shell heavy grooved 18/6.

BASTONE'S.—650×65 Henley heavy plain 32/6.

BASTONE'S.—Hutchinson tubes, 26×2 5/6, 26×2¼ 6/-, 26×2½ 6/6, 26×3 7/6.

BASTONE'S, 228, Pentonville Rd., King's Cross, London, N.1. Tel.: 2481 North. [1221

ECONOMIC.—Just delivered, all new Kempshall clearance covers; no old stock; goods carriage paid; on approval against remittance.

ECONOMIC.—26×2¼ Kempshall anti-skid, 19/6, listed 48/8; 26×2¼ non-skid, 30/-, listed 61/4.

ECONOMIC.—26×2½ Kempshall non-skid 45/-, listed 72/6; extra heavy cloverleaf pattern 37/6, listed 50/-.

ECONOMIC.—26×2½ for 2¼ rims, extra heavy non-skid, 37/6, listed 60/3.

ECONOMIC.—650×65 heavy non-skid pattern 40/-, listed 65/-; 700×80 3-ribbed 50/-, oversize for 650×65.

ECONOMIC.—24×2¼ heavy non-skid for 2-strokes, well-known make, 30/-, listed 45/6.

ECONOMIC.—26×2¼ 3-ribbed Pedley, 20/6; 26×2¼ wired-on fluted 7/6, pair 12/6.

ECONOMIC.—24×2¼ tubes, 6/6; 26×2¼, 7/6; 26×2½×2¼, 7/6; 26×2½, 8/-; 28×3, 10/-.

ECONOMIC Tyre Co., 137a, Lewisham High Rd., New Cross, S.E.14. 'Phone: New Cross 1393. [1215

TYRES.—See Bancroftian Advertisement under Miscellaneous. Stelastic, Pedley, Kempshall, Hutchinson; extraordinary prices. [0845

TYRES by Best Makers; nearly half present prices.—Rubber studded, 28×2½, extra heavy, 37/6; 28×3, extra heavy, 42/-; 26×2½ sidecar cover, 16/6; Kempshall heavy anti-skid, 26×2¼, 18/6 each.—Service Co., 292, High Holborn, London, W.C.1. [8747

CLEARANCE Sale; leaving the district. Note these prices. All new; worth double.—26×2 Beldam, 14/-; ditto, combination, 22/6; 2¼ ditto, 30/-; Beldam extra strong, 26×2¼, 25/-; ditto, rubber studded Hutchinson, 21/-; extra heavy, 25/-; 26×2½ heavy, 25/-; ditto, Continental, 15/-; 26×2¼ and 2⅜ tubes, 6/-.—Millard, Sydenham Rd., Guildford. [X0786

TYRES.

NEW Heavy Beaded Covers, 26×2 16/-, 26×2¼ 25/-, 26×2½ 27/6; butt-ended tubes, 26×2¼ 8/6, 26×2½ 9/-; endless tubes, 26×2¼ 7/6, 26×2½ 8/-; sent approval carriage paid receipt remittance.—Palmer's Garage, Tooting. [9191

TANKS.

TANKS of every description; repairs, re-enamelling. Write for booklet.—Green, Water St., Blackfriars, Manchester. [0900

TANKS.—Tanks any shape to order, repairs or enamelled; disc for motor wheels; general sheet metal work; lists free.—Attwoods, 86, Rosebery Av., E.C. Tel.: Central 12445. [9922

INSURANCE.

FOR Insurance of all kinds (specially motor), apply, Ernest J. Bass, Insurance Broker, Bishops Stortford. [0693

DREADNOUGHT Motor Cycle Policies at Lloyd's. Premiums from £1/7/6, payable yearly, quarterly, or monthly. Before insuring elsewhere, write for prospectus.—Roys, Ltd., 199, Piccadilly, London. [7734

AGENCIES.

ADVERTISER wishes to represent a first-class firm of motor and cycle accessories in the South or West of England.—Box 2,530, c/o *The Motor Cycle.* [X0559

TUITION.

MOTOR Tuition.—The British School of Motoring, Ltd., gives the highest standard of training in driving, mechanism, and repairs for the lowest fees in England. Call, or write for full particulars.—The British School of Motoring, 6, Coventry St., Piccadilly Circus, W. [0953

SITUATIONS VACANT.

WANTED, draughtsman, used to small motor work preferred.—Apply, C. Binks, Ltd., Phœnix Works, Eccles. [9907

PERMANENT Situation for man of good education with good knowledge of motor cycle trade, to attend to correspondence and sales.—Rider Troward and Co., 31, High St., Hampstead. [1244

MOTOR Cycle Factory requires under works manager; must have proved organising ability; full knowledge of latest light machine, tool methods and progressive systems for large output. Progressive prospects for suitable man.—Box L8,087, c/o *The Motor Cycle.* [1348

FINANCIAL.

PARTNER with capital required for large South London motor cycle business.—Box L8,104, c/o *The Motor Cycle.* [1451

SALESMEN Representatives required in all parts of the Kingdom for post-war boom in motors. Applicants must have about £600 to £700 capital. They can make an income of several thousands.—Write for particulars, Maibohm Motors, c/o London Joint City Midland Bank, 8, New Coventry St., London, W. [9873

PATENT AGENTS.

INVENTORS' Advice and Handbook Free.—King's Patent Agency, Ltd., 186, Queen Victoria St., London. [5818

CONSULTING ENGINEERS.

CONSULTING Engineer, 15 years' experience, answers questions concerning new or old motor cycles. Letter of advice 1/6. Send fullest details.—66, Murray Rd., Rugby. [X0481

A. WANTED.

SUNBEAMS, Harleys, A.J.S.'s, Enfields, B.S.A.'s, Nortons, Triumphs, Matchless, and Morgans; 1915's and later purchased for spot cash.—Maudes', 100, Gt. Portland St., London, W.1. [6311

A.A.

ANY Make Motor Cycle, combination, or light car bought for cash. Please write, giving date, price, time viewed. Will call with cash if right price.—Speechley, 1, Gunnersbury Lane, Acton Hill, London, W.3. [1457

ZENITHS.—90×77½ twin.—Maudes'.

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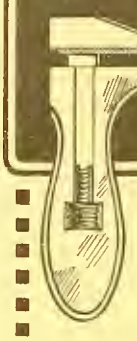

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MODERN
MOTOR CYCLES
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Any good make.
State price and when and where can be seen.

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MOTOR Cycle or Combination, under £40.—5, Villas-on-the-Heath, Hampstead. [1311

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WANTED, Douglas front wheel, 26×2¼in.—Jones, Berkeley House, Gloucester. [X0558

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WANTED, frame (61618) for Hobart lightweight.—G. Blenkin, Burstwick, Hull. [1276

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WANTED, G.P. Morgan.—Particulars to Pattison, 87, Allesley Old Rd., Coventry. [X0807

WANTED, Silencer, 1914 Douglas.—Cowes, 58, St. George's Sq., Portsea, Portsmouth. [1413

WANTED, Ariel Sidecar, good condition, fit 3½h.p.—C. Wheatley, Blackwater, Hants. [1403

WANTED, combination, conchbuilt, or cycle car.—H.S., 33, St. Stephen's Rd., Bow, E. [1255

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COMBINATION or Solo, late model.—Particulars, R. Charles, Station Rd., Glenfield, Leicester. [1295

WANTED, cylinder and piston for 1914 4½h.p. Singer.—Smith, 20, Park Crescent, York. [X0553

WANTED, dissolved acetylene cylinder; also Mabon gear.—Daws, Mill St., Loughborough. [X0722

WANTED, good motor cycle or combination; spot cash.—C.S., 497, Old Ford Rd., Bow, E.3. [1390

NORTON Frame, 1914, 3½h.p., and mudguards.—Particulars to Fleming, West End, Woking. [1399

BACK Cylinder for J.A.P., o.h.v., 85×65.—Wilson, Lower Daggors, Alderholt, nr. Salisbury. [1398

TRIUMPH, 3-speed, 1914-15, or part exchange 1915 2¾h.p. Allon.—Newton, London Rd., Bognor. [1269

WANTED, A.J.S. or Enfield combination, not earlier 1915.—Holdsworth, 22, Clare Rd., Halifax. [1332

SUNBEAM Combinations; send particulars and price.—Service Co., 292, High Holborn, W.C.1. [9306

A.J.S., Sunbeam, or Enfield combination, cash waiting.—Farrar, 19, Hopwood Lane, Halifax. [9303a

WANTED, 7-9h.p. F.N. engine, also 6h.p. Peugeot, or other.—D. Robertson, Medical School, Leeds. [1253

WANTED, Douglas 4h.p. combination, 1918 model.—Winter, 61, Walsingham Rd., Hove, Sussex. [1291

WANTED, 2-speed, for 4h.p. Bradbury; condition immaterial.—5, Main Rd., Ynysboeth, Abercynon. [1305

WANTED, 3½h.p. Rex cylinder, or a good engine.—Full particulars, James Aitken, Elsrickle, Biggar. [X0825

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WANTED, Douglas, or good 2-stroke, cash transaction.—Box L8,102, c/o *The Motor Cycle.* [1447

WANTED, Enfield or Matchless combination at once.—51, Maplethorpe Rd., Thornton Heath. [1448

WANTED, A.J.S., Indian, or similar combination; no dealers.—Box L8,103, c/o *The Motor Cycle.* [1449

WANTED, late combination; condition immaterial; running preferred.—39, Balham New Rd., Balham. [X0841

P. and M. Combination, mechanically perfect essential, and cash bargain.—41, Ashford Rd., Cricklewood. [1418

ARIEL 5-6h.p. Combination. Send particulars and price.—Service Co., 292, High Holborn, London, W.C.1. [8889

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Christmas, 1918.

FOR the first time since 1913 we are able, without a feeling of inappropriateness, to wish our readers most heartily the good old-fashioned wish, "A Merry Christmas and a Happy New Year." Once more at the season of "Peace on earth and goodwill towards men" have wars been made to cease throughout the world, though the time of universal goodwill is not yet. Our sailors and soldiers have covered themselves with glory, and have helped to win the greatest victory the world has ever seen. It now remains for our statesmen to impose a just and lasting peace upon the vanquished aggressors. We have our views of the terms which such a peace should contain, but we do not intend to weary our readers, who doubtless also have their own ideas of the subject, by reciting them here.

Our duty lies not with the high politics of Europe, but with the future of the motor cycle as an implement of utility, health, pleasure, and sport—a much more attractive subject, and one upon which we can look without any misgivings for the future.

Therefore to our friends the manufacturers we wish greatly increased output and big dividends—but not too big, please; to those serving with our forces abroad, a speedy and safe return to their native country; to the older riders, tours and country jaunts in plenty; to the younger, races, trials, and hill-climbs galore; to all we wish an improvement in the quality of petrol combined with a reduction in price; a good supply of benzole; the abolition of that grandmotherly absurdity, the speed limit; an absence of tyre troubles; good weather and good roads. Given all these things, and a few more, our final wish of a Happy New Year becomes almost superfluous. At any rate, we hope that such is the case. And so:

Heap on more wood! The wind is chill;
But let it whistle where it will
We'll keep our Christmas merry still.
—SIR WALTER SCOTT.

Cutting Down the Cost.

THE question of cost reduction becomes more and more important as the market for low-priced motor cycles extends. To produce a satisfactory, low-priced motor cycle is a problem requiring more brains and care than that of producing a very good machine at a very high price. Naturally, in any case, manufacturers cut the costs as much as possible by employing the most efficient methods and labour-saving ideas in their works, but very few indeed give much real attention to saving in the design. The influence of design on the cost of engineering products is perfectly well understood and carried out in so far as no work is put on the machines which will be of no benefit to the purchaser. But to go further than this, the advantage to the user should be proportionate to the extra cost. For instance, if an alteration of design increases the cost a sovereign and the value of the finished part by 5s., that is bad design, likewise a design reducing the cost by 20% and only reducing the value of the finished article by 2% is a distinct improvement.

Idealists maintain that a machine should be as good as it is possible to make it, and the price a very minor consideration, but it must not be forgotten that in a necessity, like the motor cycle, provision has to be made for a large class with small purses. In the future there will be much more competition in the motor cycle trade, and no sale for a motor cycle where money is spent on details which do not give a proportionate return to the purchaser.

There are two points from which the cost can be considered, namely, the convenience of the general design and the cost of individual parts. The former entails the use of a few parts of simple outline and the fixing of as many parts as possible on machined facings, so as to avoid expensive lining-up in erecting. Even among the cheaper parts, no part is so small that its cost should be beneath the consideration of the designer.

An index to the advertisements in this issue will be found on the page facing the back cover

REMINISCENCES OF PRE-WAR WINTER TRIALS.

(1) A free engine Triumph ascending Kop Hill. (2) Combe Basset on the London-Exeter course. A competitor in the 1912 event. (3) The first London-Exeter run. Preparing to leave Salisbury. (4) The late A. J. Moorhouse in the first London-Exeter run. (5) Cornering on grease. To touch the ground with the foot in this manner is to risk a penalty. (6) The bend on Edge Hill. (7) A "check." (8) "Reg." Holloway crossing Salisbury Plain in the 1912 London-Exeter run. (9) "Konked" out—surface too much for them.

Occasional Comments by "Ixion"

British Oil.

THE possibilities of discovering oil fields in Great Britain throw into high relief the necessity of safeguarding the benzole industry from the control of oil-importing syndicates. Cheap motor spirit will be more vital in the coming era of high prices than ever it was. The British consumer has long lain at the mercy of the oil-importing syndicates. The benzole output, vastly as it has increased during the war, is still only a drop in the giant bucket of our annual liquid fuel consumption. Benzole reinforced by British oil wells might just be formidable enough to curb the rapacity of the importers.

Some Motor Cyclists who have Made Good.

IT is not only the car firms who have deserved well of their country in the war. Two of the very best "hot stuff" scout engines now in existence have been designed by ex-motor cycling engineers. One of these designers is in the Services, and his engines have inspired special terror in the Hun for some eighteen months past, though his achievements have never yet been disclosed in the press. He has not received either cash or promotion or decoration. Another motor cycling designers' inventions largely dominated the aircraft programme during 1918, and he, being a civilian, has presumably reaped the due reward of his deeds. This is another instance of the unfairness of our war organisation. Had we but put the whole nation into khaki and on pay and rations in 1914 ——!

COMPLIMENTS OF THE SEASON.

To our readers—at home and Overseas, in khaki, blue, and mufti—we send Greetings. We wish you all a Merry Christmas and a New Year full of happiness awheel.

A Bet.

A GOOD yarn is going the rounds anent the new A.B.C. bicycle. The bottom dropped out of the war so abruptly that Mr. Bradshaw—like all other motor engineers—was caught napping. He had his engine ready, for it had been a "munition" for four years past, but his brain had been switched off motor cycle gears, frames, etc., for many a long day. The managing director of the firm who had previously covenanted to manufacture the post-war A.B.C. bicycles came round at 60 m.p.h.: "How soon can you have the drawings of that bicycle ready?" Mr. Bradshaw defined the necessary preliminary tests; when these were agreed upon, he estimated the 'bus would be ready to go into production in three weeks. "Impossible!" "What will you bet?" "£100 a day premium if early: same penalty if late!" "Done!"

Save me from my Friends.

THIS may be the 1919 slogan of the flat twin. Tom, Dick, and Harry, observing the fame of the Douglas, A.B.C., and that ilk, have gone off the deep end into flat twins, and every back-street, one-horse, file-and-vice factory is going to make them. As a consequence we shall see a certain percentage of duds. Wherefore let me remind the incautious buyer that a flat twin is by no means an easy engine to design. I do not consider we have yet seen an ideal example of this type. I classify them in my own mind according as they pull like a brewery dray-horse on top gear or "rev." like a speeded up Vickers on a low ratio. I have yet to strike the F.T. engine which combines these desirable qualities; and the baser sort of F.T. is apt to isolate one of the points too exclusively, in which case it is bound to be a pig on bottom or a swine on top. Furthermore, the lubrication cannot be balanced without intelligence. Pity the poor owner whose front piston is always on the verge of seizing, whilst his rear tappets emit greenish fountains continuously. *Pour moi*, before I part with any of my hard-earned cash I like a good road trial. This maxim naturally applies to any new engine or machine; and I write thus merely to warn readers unacquainted with flat twins what are the possible snags which need watching.

Christmas Trials of Pre-war Days.

A Review of London-Exeter Runs and Christmas Trials.

MANY are the lessons which have been deduced from the winter trials, and not the least was that demonstration of motor cyclists' enthusiasm which made them possible. Such enthusiasm and such trials have done more to bring the motor cycle to its present state of perfection than perhaps anything else. The summer trials and T.T. races have done their share also, especially in the direction of popularising the pastime, but the winter trials undoubtedly called for greater enthusiasm and pluck than those others when the weather and conditions generally rendered them more comfortable.

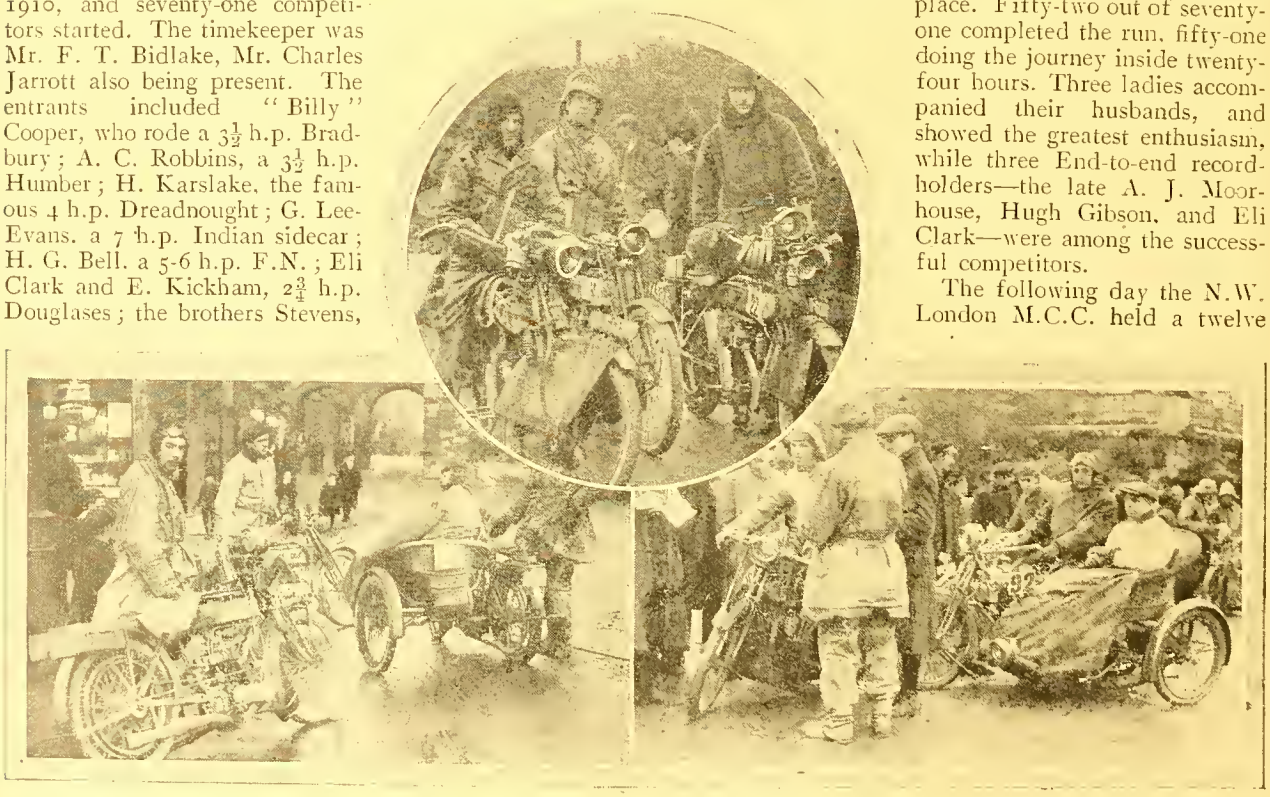
A start of a Sheffield Christmas trial to Bridlington and back.

The M.C.C. London-Exeter runs in particular revealed the motor cyclist as a thorough sportsman to whom motor cycling came first and best of all hobbies, for it required pluck to leave the Christmas festivities on Boxing Night for a three hundred and twenty mile journey through rain and slush.

The first of these trials was held on Boxing Night, 1910, and seventy-one competitors started. The timekeeper was Mr. F. T. Bidlake, Mr. Charles Jarrott also being present. The entrants included "Billy" Cooper, who rode a 3½ h.p. Bradbury; A. C. Robbins, a 3½ h.p. Humber; H. Karslake, the famous 4 h.p. Dreadnought; G. Lee-Evans, a 7 h.p. Indian sidecar; H. G. Bell, a 5-6 h.p. F.N.; Eli Clark and E. Kickham, 2¾ h.p. Douglases; the brothers Stevens, 2½ h.p. A.J.S.'s; Victor Olsson, an Oxted sidecar; Alan Hill, a 3½ h.p. Rudge; "Jack" Woodhouse, a 3½ h.p. Calthorpe; "Archie" Sproston, a Rex; Hugh Gibson, a 3½ h.p. Bradbury sidecar; Frank Smith, a 5-6 h.p. Clyno; Arthur Moorhouse, a 3½ h.p. Rex; Rex Mundy, a 3½ h.p. Triumph; F. McNab, a 3½ h.p. Trump-Jap; J. R. Haswell, a 3½ h.p. Triumph; S. Sawer, a 3½ h.p. Premier; and "Sam" Wright, a 3½ h.p. Humber. Space is not available for the full list.

It is interesting to note that in this trial the Morgan Runabout made its *début* as a competition machine, incidentally winning a gold medal. Several competitors got lost, and were compelled to "knock up" cottagers to enquire the way. "Several of the fixed gear sidecars were in difficulties on the severe hills, Gibson's Bradbury being a notable exception" (*vide The Motor Cycle*, December 29th, 1910). Several of the heavier singles were side-slipping all over the place. Fifty-two out of seventy-one completed the run, fifty-one doing the journey inside twenty-four hours. Three ladies accompanied their husbands, and showed the greatest enthusiasm, while three End-to-end record-holders—the late A. J. Moorhouse, Hugh Gibson, and Eli Clark—were among the successful competitors.

The following day the N.W. London M.C.C. held a twelve



(Top) Winter equipment in the 1911 London-Exeter run. (Left) Competitors in the Birmingham-York trial of 1912. (Right) 1912 London-Exeter competitors leaving the Salisbury check

B.S.A. MOTOR BICYCLES

WITH THE ARMIES AT THE FRONT

German South-West Africa.

The military authorities selected B.S.A. Motor Bicycles for the campaign in German South-West Africa, and the soundness of this decision is confirmed by an officer with the expedition, Major W. Whittall, who writes :—"Their work had to be done over country that I should have said beforehand was utterly impossible for motor cycles at any time. Sand into which the single-tracker sank up to the foot-rests, and that for mile after mile. Where the sand ceased the rocks began. Sometimes the riders got a chance of driving along a railway embankment from which the enemy had torn up the track bodily. The railway was generally mined at frequent intervals, but they infinitely preferred to take the chance of being blown up to the terrible labour of getting the machine along the ordinary tracks. And magnificently they did their work, men and machines alike, with never a grouse and never a failure, earning golden opinions from all."

"WITH THE FLAG THROUGH GERMAN EAST AFRICA."

Experiences described by motor cyclist despatch riders in the East African Campaign.

COPY POST FREE.

THE BIRMINGHAM SMALL ARMS COMPANY LTD.,
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The Fables of Fame

The Thirteenth.

Even as the era which has been full of the changing fortunes of war, full of the vicissitudes of giant battles, is now drawing to a close, in fact to all intent and purposes has ended, so must conclude the fables with which I have tried to emphasize some worthy points about the

CLYNO

THE Sidecar Motor Cycle.

This, therefore, is my last, and I will try and make it serve a useful purpose.

Even as you, my motor friends, have over these long years of trouble made plans of what you'd do when Peace returned, so would you be well advised to make such plans as will ensure you the earliest details concerning the Post-War Clyno, study carefully its many points of merit, every one of which you will find worthy of your careful observation.

To ensure that you may hear of *every one* of them with minimum delay, I further recommend you to write the makers 'ere another day has passed.

Here is the Post-war Clyno Policy—

Mass Production of One Model (8 h.p.)
Competitive Prices of both Outfit and Spares
And Strictly Rotational Deliveries.

THE CLYNO ENGINEERING CO.,
Pelham Street, WOLVERHAMPTON

2002

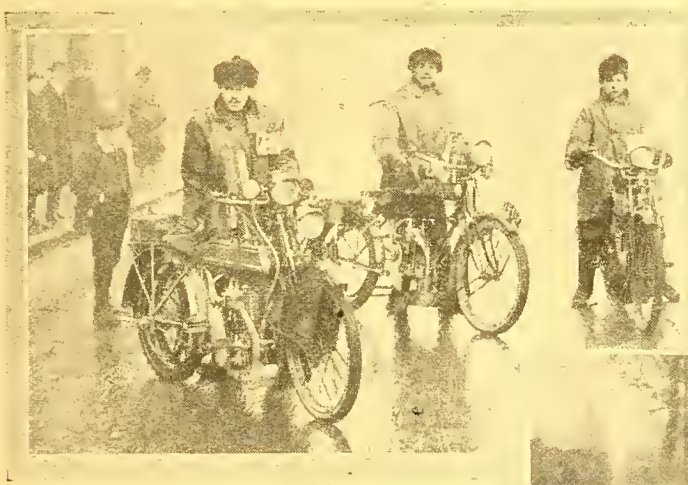
Christmas Trials of Pre-war Days.—

hours winter run to Gloucester and back, and again there was a good entry and several well-known competitors, while the Sheffield and Hallamshire M.C.C. winter run to Bridlington and back attracted seventeen entrants. In this latter trial the roads were bad and snow-covered, while a blizzard made the task more difficult. Nevertheless nine finished within the scheduled time, Jack Haslam, on a Zenith, and Fred Dover, on a Triumph, being among them.

The Exeter Club also held a successful trial on Boxing Day, which included a timed hill-climb over 1¼ mile of Shaldon Hill, while the Harrogate Club held a trial over Yorkshire roads. On this trial snow six inches deep was encountered, belts refused to grip, boots were worn through as they were being continually used as temporary jockey pulleys, and those competitors who could keep going dared not stop owing to inability to restart on the treacherous roads. Of the twelve entrants, ten started, but only two arrived home in the time limit. The ride was one of the most arduous ever held by a Northern club.

Mr. W. Cooper, who proposed the twenty-four hours' trials, in the first London-Exeter run on Boxing Night, 1910.

The 1911 London-Exeter trial attracted no fewer than 119 entries, of which exactly 100 signed their names on the first check sheet. Again the well-known



The Birmingham M.C.C. twelve hours trial to York. Three competitors leaving the latter City. The condition of the street promised more mud and slush out in the open country.

names figured in the list, with others such as W. H. Wells (Indian), W. H. Bashall (Enfield), J. T. Bashall (7 h.p. Bat), "Billie" Pratt (P. and M.), V. Wilberforce (Douglas), Reg Holloway and "Jack" Mills (Premier).

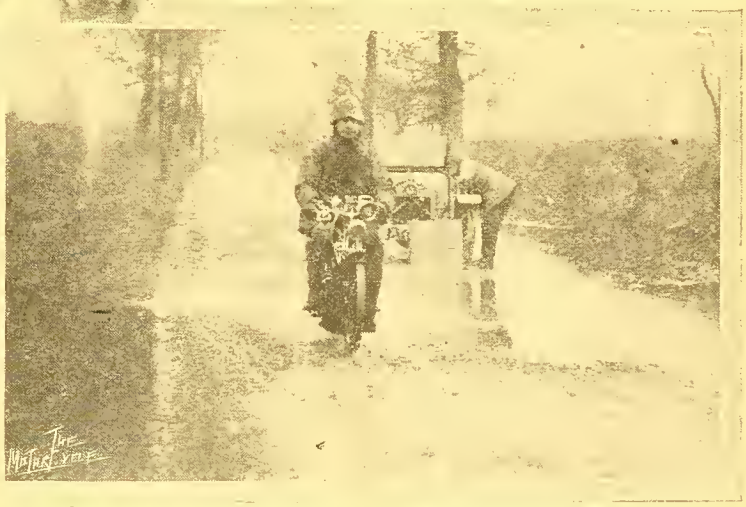
As was usual in winter trials, all sorts of mudguarding devices were fitted in an endeavour better to equip "standard" machines. Many of these efforts were weird, wonderful, and wasted, for, inside the first twenty miles, nearly every rider was literally smothered from head to foot, back and front, with a thick plaster of mud. Again Mr. Bidlake was the timekeeper, and sent the competitors away in pairs at minute intervals. Although a great deal of rain was not encountered, the roads were in a terribly sodden state.

This event was not altogether a reliability run, but was of a more go-as-you-please character; the only time schedule set was that the riders were not permitted to leave Salisbury and Exeter before fixed times. An official observer for silence awarded honours to one of the four-cylinder F.N. machines and to Frank Smith's Clyno as the two quietest machines to pass him.

The Birmingham M.C.C. now entered the winter competition field with a run to York and back. The weather was foggy and the roads unpleasantly wet. Mr. Norton was one of the competitors in this event, and several other riders of note, including at least three who have given their lives in the war, *i.e.*, Vernon Busby, "Corah" Clarke, and W. Baxter. (Clarke was one of the first of the competition riders to fall, while Baxter died in an exploit acknowledged by the posthumous honour of a V.C.) Tom Peck, the bicycle End-to-ender, also competed on a Rudge.

Again the Sheffield and Hallamshire M.C.C. held a winter run to Bridlington, thirteen riders earning a medal. This year winter club runs became fashionable, and among the other clubs to organise them were the Stockport M.C.C., the Blackpool and Fylde M.C.C., the Dublin and District M.C.C., and the Harrogate and District M.C.C.

The 1912 London-Exeter event was run under very severe conditions, and so thick was the mud in parts that wire wheels were plastered until at first sight they looked like the artillery type, while several riders were pulled up by ungenerous police because their registration



Flooded roads were encountered on the London-Exeter run of 1911. Mr. Eli Clark on a Douglas at a water splash between Shaftesbury and Sherborne.

Christmas Trials of Pre-war Days.—

numbers were not clear. There were 163 entrants, and in looking through the long lists of familiar names to find others not yet mentioned, including Admiral Sir R. K. Arbuthnot (who lost his life in the Jutland Battle); Mr. Philip Grout, who rode a 6 h.p. A.J.S. sidecar; Reg. Holloway, Premier; Karslake, on a Rover (the old Dreadnought had been pensioned off); Geo. Brough; Archie Cocks, Connaught; A. Sumner, De la Hay, and F. W. Southern, Sunbeam; Featherstonhaugh, C. T. Newsome, and W. H. Noble, Rover; R. E. Guest, Matchless; Geo. Griffith, 8 h.p. Zenith; and Rev. E. P. Greenhill, G.W.K., with Mr. Loughborough as a passenger.

The trial was full of incident: at least two competitors caught fire—L. E. Lucy had his clothes catch on fire, and ran down the street, but was prevailed upon by the redoubtable "Billy" Pratt to lie down in the road, and had the flames quickly extinguished by the latter with the aid of a sack. Reg. Holloway found a poster on the wall which read "Are we mad?" and carried it on his sidecar throughout the trial. Alan Hill competed on a white Humberette which looked very smart *at the start*. Ninety-five competitors secured gold medals, fourteen being awarded "silvers."

The N.W. London, Birmingham, Bournemouth, Sheffield, Harrogate, Sutton Coldfield, and several other clubs held winter trials this year which were highly successful. In the N.W. London M.C.C. London to Gloucester and back there were forty-two starters, twenty-seven of whom retired, five being in the cycle car class. The S. Birmingham M.C.C. run to Gloucester attracted twenty-four entrants, twenty of whom faced the starter; while the Birmingham M.C.C. held a trial to York and back with twenty-seven starters, of whom ten only finished. In the Boxing Day trial of the Harrogate M.C.C. there were nine starters, four of whom retired, three were disqualified, and only two secured awards. There were eighteen entrants in the Sheffield Club's run to Bridlington this year, but five only secured awards.

A Record Entry.

The 1913 London-Exeter run had a record entry, no fewer than 231 entries being received. When it is remembered that this was a Boxing Night event the newcomer to the ranks of motor cyclists will appreciate something of the enthusiasm that animated the pre-war riders. Again the veterans' names are repeated, and many new ones just as well known among them.

Over 150 medals were awarded. The trial was not without incident. A G.N. cycle car was "ditched" twice, being shod with four smooth-tread tyres. One A.C. Sociable was driven the last twenty miles on the rim to the detriment of the wheel. We recall finding one competitor between Blandford and Dorchester with his engine out of the frame.

This was the fourth London-Exeter run, and, as usual, many riders at the finish swore never to compete again. They little thought that the next Boxing Day would find many of them on the battlefield.

The N.W. London M.C.C. held an open trial to Gloucester, sixty-two competitors facing the starter, thirty-eight riders of whom survived the course, roughly a third failing to finish.

The start of a Midland winter trial.

In the Harrogate Trial, the renowned Sutton Bank was included, and, as was to be expected, caused many a failure. Two single-geared singles tied for first place (a Triumph and a Singer), while a Scott ran a close second.

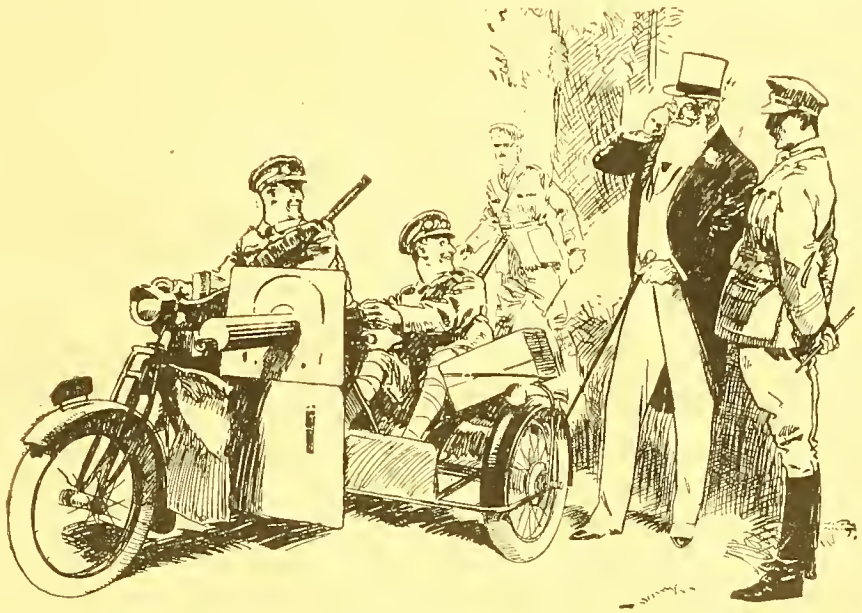
This year the Bristol M.C.C. held a twenty-four hour trial to Land's End and back, and the severity of the trial may be judged from the fact that only one gold medal was obtained among the thirty-one starters.

The Birmingham M.C.C. repeated its ride to York with twenty-six starters. Five qualified for gold medals, while among the silver medallists was H. Newey, who drove a 2¼ single-geared two-stroke sidecar outfit. Seventeen only finished.

The S. Birmingham Club went to Gloucester with twenty starters, including Vernon Busby and S. A. Rowlandson. Eleven finished.

There were thirty-four starters this year in the Sheffield-Bridlington trial, and owing to the terrible weather—it rained heavily all the journey—side-slips were very prevalent, four riders suffering bad skids. Ten only finished. The Harrogate trial attracted sixteen entrants, nine of whom finished.

The Bournemouth Trial had an entry of fifty-five, and this time well-known members of the competition



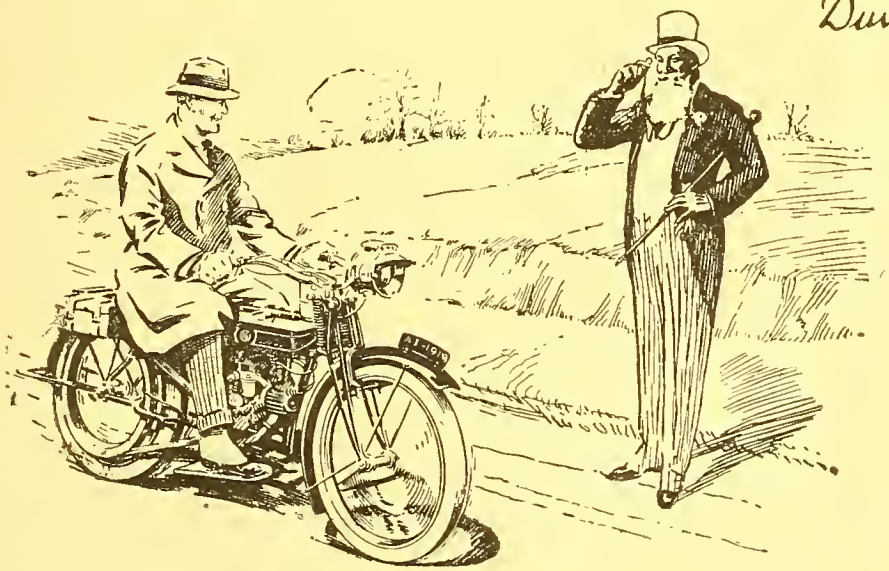
FROM WAR TO PEACE.

FROM the very first day of the war up to to-day we have supplied Dunlop motor cycle tyres to the British and Allied Armies and we have received good reports on their service-giving qualities from every front where motor cyclists were doing their bit and a bit over.

These tyres are identical in quality and pattern to the motor cycle tyres we sold to the motor cyclist before the war and the tyres we're looking forward to making for *your* machine in the pretty near future will be just the same fine goods, too.

That's the message I want to send to you who are waiting for the sun to shine once again on motor cycling.

Dunlop.



The Return of the Motor

RESTRICTIONS on Motoring are already being removed, and if you have a petrol licence you can use your car within a 30 mile radius.

But Insure It First!

A MOTOR UNION policy covers all accident risks and makes motoring free from anxiety.

Ring up Regent 2200, or send a postcard to-day to:

The Motor Union Insurance Co. Ltd.
10, St. James's Street, S.W.1.

Under the auspices of the

Christmas Trials of Pre-war Days.—

fraternity were among the starters. The Liverpool A.C. also had a Christmas trial to Carlisle. There were forty-eight starters, thirty-two handing in their cards at the finish; by these seven first class and five second class awards were gained. The whole trial was rife with incident. The condition of Shap was very dangerous, since the surface in places for long stretches, both up hill and down, was a mass of ice.

Again we find many names which also appear in other lists of trials held during the same week, which shows that some of the competition brigade lived a very strenuous life.

The Necessity for Winter Trials.

These were the last of the Christmas runs and trials; whether we shall see their like again is a moot point. The sequence has been broken, but most of the supporters of such trials are only too eager to re-enter the field of such competitions.

Undoubtedly Christmas trials and events like the Colmore Cup trial and other early spring events are very necessary to prove the reliability of the modern motor cycle. Only events held under winter conditions can demonstrate the suitability of motor cycles for all-weather riding. The proportion of winners of awards shows that the reliability of the average machine is no longer a question which can be decided on a 320 mile run, even in the depth of winter, but such runs reveal little weaknesses on points of comfort, such as mudguarding—they encourage the development of lighting sets and the weatherproofing of magnetos.

Stringent Rules not Advocated.

In future Christmas trials probably more will be made of the mudguarding problem, but it may not be good policy to be too stringent, as the popularity of the events was due almost entirely to their informal character. Every entrant had a good sporting chance of getting an award, and more technical trials, such as the A.C.U. Six Days event, are so trying, even in the best of weather, that to hold them in the winter would only attract the trade entrants—the sporting private owner may not be inclined to forego part of his Christmas festivities if too many rules are to be observed. The popularity of the Scottish Six Days is proof of this, for it is always voted to be more pleasant than the A.C.U. event, and, after all, a Christmas trial must be made as pleasant as is possible when the elements threaten discomforts to try the patience of even the best sportsmen, without introducing a multitude of irritating rules.

FOUR CYLINDERS IN ONE.

A Novel Engine produced in America.

AN engine only 18in. long, 18in. high, which, it is claimed, develops 56 h.p. and weighs only a little more than 100 lb., has been produced in America. The design is unusual and somewhat reminiscent of the Wishaw rotary engine designed and built by a Scotch engineer just before the war.

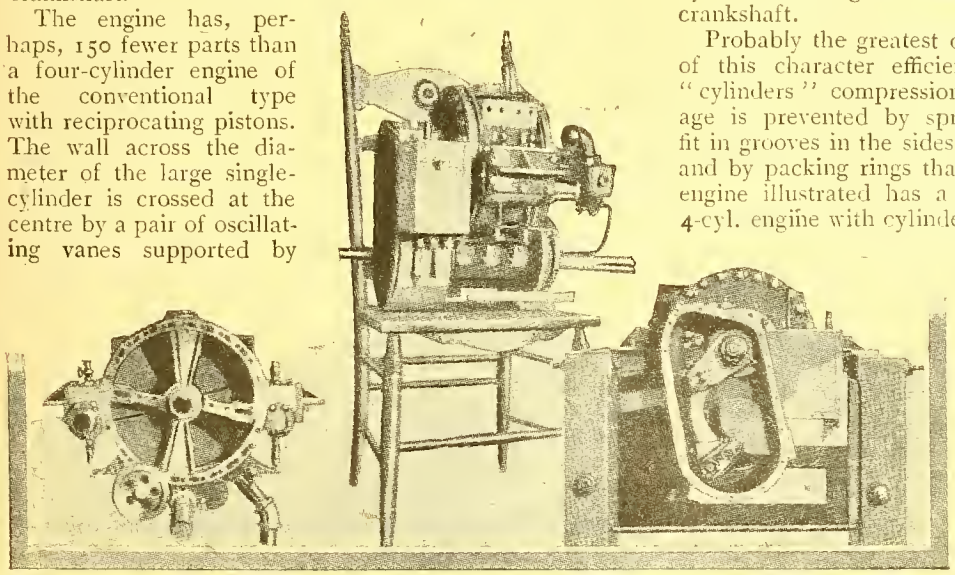
This American engine is not of the rotary type, but has a single cylinder divided into four compartments by two walls and two arms which oscillate. It works on the four-stroke principle, and performs the complete cycle of operations in one revolution of the crankshaft.

The engine has, perhaps, 150 fewer parts than a four-cylinder engine of the conventional type with reciprocating pistons. The wall across the diameter of the large single-cylinder is crossed at the centre by a pair of oscillating vanes supported by a hollow trunnion. This arrangement, it will be understood, divides the cylinder into four different chambers. These in turn correspond to the four cylinders of an ordinary engine. Firing occurs in 1, 2, 3, 4 order. As an explosion takes place in one compartment, the rocking piston head simultaneously compresses gas in the next chamber, fuel is drawn into the third one, and the fourth space exhausts.

The Connecting Rod.

The oscillatory motion is changed into rotary motion by a connecting rod which turns a counterbalanced crankshaft.

Probably the greatest difficulty in making an engine of this character efficient is that of rendering the "cylinders" compression tight. In this engine leakage is prevented by spring-held packing strips that fit in grooves in the sides and ends of the piston head, and by packing rings that encircle the trunnion. The engine illustrated has a capacity equal to that of a 4-cyl. engine with cylinders $5\frac{1}{8}$in. bore and 5in. stroke.



(Left) The head of the semi-rotary engine, showing interior of cylinder. The upright member is the rocking piston head. The size of a 56 h.p. model is indicated by its comparison with the chair shown in the middle picture.

(Right) The connecting rod and counterbalanced crankshaft.

SECOND-HAND MOTOR CYCLES.

Some Notes on Miscellaneous Advertisements, and Hints to Advertisers of Second-hand Machines.

SCARCELY a week passes but what we receive letters from readers who tell us that they read every line in *The Motor Cycle*, including the advertisements, especially the "miscellaneous columns at the end of the book." The promise of an early release of petrol, and, in many cases, release also of riders from military service, reminds one that the time has come for the motor cyclist to provide himself with a machine.

It is common knowledge that the supply of new machines will be strictly limited for a time, so even those who have decided to buy "something new" are thinking of obtaining a temporary mount until it is available.

In addition, there are thousands of potential buyers who have not before ridden motor cycles—for years, perhaps, it has been a pleasure in anticipation. Now the time has come to realise their dreams.

After perusal of the "small" advertisements, one concludes that quite a large number of them are sadly lacking in detail, and if the advertiser does not receive the expected number of replies it is due entirely to the composition. Sometimes quite important details are omitted, and, in some cases the reader obtains an idea that this is intentional in order to represent the machine offered as something better than it is. No doubt the majority, however, are merely cases of carelessness, and it is with the object of pointing this out that this article is written. The following advertisements are taken from last week's issue:

5-6 h.p. twin Alldays Allon . . . . £100.

The first question asked by the potential buyer who has followed the reviews of models in these pages is whether this machine is a side-by-side twin two-stroke. If this is so, then the word "two-stroke" should have been added. If it is not a two-stroke model, then, we think, the word "Allon" is inserted in error.

Ariel, 4 h.p., late 1913, three-speed . . . . £25.

So far as we are aware, Ariel Motors, Ltd., have not made a 4 h.p. model.

Ariel combination, 1917, three-speed countershaft, kick starter, decompressor, engine just overhauled. . . . .

Is this a 3½ h.p. or a 5-6 h.p. model? No price is mentioned, and the only clue is the word "decompressor," which the *experienced* motor cyclist knows is fitted to the 3½ h.p. model.

Bradbury 3½ h.p. two-speed combination . . . . £40.

Only "old" riders know that there are two Bradbury two-speed models, one having an N.S.U. gear on the engine-shaft. No date is mentioned. The addition of the words "countershaft gear" or "N.S.U. gear," whichever the case may be, is desirable.

Brough 3½ h.p. twin, two-speed . . . . £27.
Brough.—3½ h.p. 1916 twin Brough, 3-sp. gear . . £55.

The price of the former machine suggests that it is not a flat twin, to which, in all probability, the second advertisement refers.

1916 2¾ h.p. Enfield twin, chain drive . . . . £25.

We were under the impression that the manufacture of the 2¾ h.p. Enfield was abandoned some years before 1916.

1914 Hobart, £22 10s.; also wicker sidecar, £12.

No h.p. is given. The reference to the sidecar suggests that it is a machine large enough for sidecar work.

7 h.p. Indian, 1913, good condition . . . . £50.

Is this a single-gear, clutch, two-speed, or three-speed model? It may be argued that the date is sufficient, but different persons have various conceptions of the definition of date. Some give the date when the machine was purchased; thus a 1912 machine purchased in 1913 is sometimes quoted as 1913 model, while the specifications of the two may be entirely different.

7-9 h.p. Indian combination, just overhauled . . . £47.

One naturally assumes that this is a spring frame model, but no mention is made of this or of gears.

New Hudson combination, 1913, 3-sp. . . . . £32.

It is not clear whether this is a 6 h.p. or a 3½ h.p. model.

New Imperial-J.A.P. 1914 6 h.p. twin, 3-sp. . . £35.
New Imperial-J.A.P. two-speed model, etc. . . £35.

To those who are fairly conversant with the various types, the latter advertisement, read alone, would appear to refer to the well-known 2½ h.p. lightweight; but the newcomer to the pastime, seeing the advertisement immediately above it, might conclude that it refers to a 6 h.p. machine.

Premier, 1914, 3½ h.p., three-speed . . . . £26.

Is this a countershaft or a three-speed hub model? Both were made in 1914.

Premier, 1913, two-speed . . . . £25.

Again, is the gear of the countershaft type or a Millennium hub gear?

4 h.p. Quadrant, 1913, like new; £20 or nearest.

Is this a single-gear model? 1913 Quadrants were 3½ h.p., and 4½ h.p. = "4 h.p." might be the owner's nominal and not the makers', and, if so, the model might be a 3½ h.p. or a 4½ h.p.

Premier lady's model, 3-sp., Corvette sidecar . . £39.

No reference is made to power, type, or date. This machine is evidently the 3½ h.p. three-speed hub model, made about 1913.

Zenith, 4 h.p. J.A.P., Millford coach sidecar . . £39.

It would have been desirable to have stated whether this advertisement referred to a twin or single-cylinder model.

Single Douglas, 1912, 2¾ h.p., excellent order; £25.

Does the word "single" refer to type of engine or number of machines available? Or has there been a single-cylinder Douglas produced of which the motor cycling world has not been told?

In drawing attention to the advertisements given above a double purpose is served. First, they reveal to the intending seller that, while he may know all about the machine he is offering for sale, unless he gives details, the potential buyer is kept in ignorance of the facts. Secondly, they show the buyers that there are many points not always covered by the advertisements.

In quite a large number of cases no prices are mentioned, and where the date of the model is omitted the majority of readers assume that it is a very old machine.

The term "running order" may mean anything. If it will propel itself in spasmodic jerks for the length of the street it is in running order just as much as if it is in such a condition that immediate overhaul and replacement of several parts are unnecessary.

Nothing is gained by omitting anything which the advertiser considers something against the machine, while much may be gained by giving the fullest particulars, including date, h.p., type, mileage, equipment, etc.

One other point is worthy of mention. It is always desirable to quote the makers' nominal h.p. For example, a 439 c.c. engine is regarded as a 3½ h.p., and in the great majority of cases is so termed by the makers. Several advertisers term such an engine 4 h.p. Again, very often the four-cylinder F.N. is quoted as 5-6 h.p.; the makers' nominal is 4-5 h.p.

In conclusion, we give below an imaginary advertisement, which contains some of the many points looked for by the prospective buyer of a second-hand motor bicycle. It may be thought that such an advertisement would cost too much, but it is well to remember that when selling a £100 article a few shillings more or less is of no importance:

"X.Y.Z. 1916 6 h.p. twin combination, as in makers' 1916 catalogue, three-speed, countershaft gear, kick-starter; enclosed all chain drive; interchangeable wheels, spare wheel and tyre: coachbuilt sidecar, with hood and screen; accessories include Lucas horn, speedometer, dynamo lighting set and three lamps; full set of spares; not used since September, 1917, when it was overhauled by makers; total mileage, 4,000 miles. Photograph available."

THE A.B.C. MOTOR CYCLE.

A New Development.

AT a luncheon held at the Sopwith Aviation Co.'s works at Kingston-on-Thames on Monday, the 9th inst., it was announced that the A.B.C. motor bicycle would in future be manufactured in quantity by the Sopwith Aviation Co., Ltd.

It was in 1914, when war broke out, that the A.B.C. motor bicycle had reached a stage when it could be manufactured in quantities and sold to the public. Then the war put an end to all further developments, and A.B.C. Motors, Ltd., devoted its attention mainly to aeroplane engines. In the meantime, however, after-the-war possibilities were not lost sight of, with the result that the present arrangement has come about, and to celebrate the occasion a luncheon was given to the press. After the toast of "The King" had been proposed, the chairman, Mr. T. O. M. Sopwith, said a few words about the future of the A.B.C.

It may be mentioned that Mr. Sopwith, whose name is now so well-known in aviation circles, though still quite a young man, was in the early days an enthusiastic motor cyclist. His first public appearance was in the Tricar Trials of 1904, and thereafter he and his then partner (Mr. Paddon) sold a few machines which were then quite up-to-date mounts. Later, however, aviation claimed him, and it is as a manufacturer of aeroplanes he has become famous.

Mr. Sopwith's Speech.

Mr. Sopwith said that some seven years ago his company started building aeroplanes at Brooklands in a very small way. However, the works extended, and a skating rink was taken in Kingston. Inside a month they moved into another works. Then came the war, and the manufacture of aeroplanes was increased to a great extent, and the works grew to such a degree as to employ 35,000 people.

Only recently new premises had been opened at Ham, and this gave the company the idea that they had plenty of room in which to turn out quantities of motor bicycles. Commercial aviation would come in due time, but it was no good going at it at half cock, and it would not come with a big rush, but they were going to employ all their men and women, and soldiers coming back from Overseas, to manufacture the A.B.C., made by a company with which his firm has been in connection in the very earliest days at Brooklands, as it was in 1912 that Hawker on a Sopwith machine won the Michelin Endurance prize; and, curiously enough, their latest effort has been made with an A.B.C. engine. Seven years ago they had taken a motto—"Strength with Efficiency"—and with that motto they intended to carry on in the manufacture of the A.B.C. motor bicycle. He would also like to say that he was a strong believer in competitions, and intended to go in largely for various trials. It did not matter whether they won or not, but valuable experience was gained and excellent lessons were learnt. Mr. Sopwith then went on to speak about the arrangements which would be made with the A.B.C. Co. Nothing had been decided until the Armistice was signed, when he approached Mr. Bradshaw and asked him to turn out an experimental model. Mr. Bradshaw said it could be done in three weeks. Mr. Sopwith told him he did not believe him, but asked him to go ahead, with the result that the machine was placed on the road in eleven days, and was a well-finished job. In the next few weeks a new model would be ready and proved, and the company would be able to turn out large quantities, say one hundred a week, but no effort in this direction would be made until they were satisfied with every detail.

The New Model A.B.C.

Mr. Bradshaw then made an interesting speech, giving mechanical details of the new model A.B.C. He pointed out that the war was won on technical superiority, wonderful knowledge being gained in the war, and he considered that that superiority was as essential to a reconstructing nation to-day as it had been to a fighting nation yesterday. He pointed out that the motor cyclist was probably the largest road user in the country, and the one most neglected by the technical engineer. He had been given an engine the unbalance of which was a close competitor to a pneumatic riveter, a frame sprung in the manner of a farm cart, a lubricating system which was a combination of pure guess and a good memory—(laughter)—a carburation system which enabled him to transport about half the weight per mile per gallon that other road vehicles could transport, while his protection from the mud was so bad that it necessitated his wearing clothing suitable for a scarecrow. Mr. Bradshaw then went on to say that the motor cyclist no longer need exert excessive strength to lift his machine on the stand, as the new machine complete would weigh about 150 lb., and its centre of gravity would be but 15in. from the ground. The motor cyclist would fill up with oil on the first of the month and forget the lubrication until the first of the month following. Mr. Bradshaw then dealt with other details which have been already referred to in *The Motor Cycle*, adding, however, that the new engine would be 400 c.c., and a four-speed gear would be fitted.

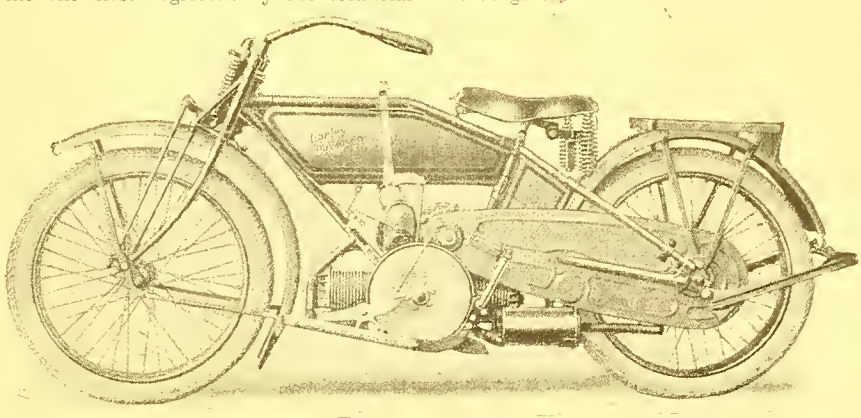
Mr. E. M. P. Boileau, *The Motor Cycle*, said Mr. Sopwith's early motor cycling experiences fitted him to be head of a motor cycle manufacturing concern.

THE HARLEY-DAVIDSON LIGHTWEIGHT.

Preliminary Particulars of a New Opposed Twin Model.

WE made some references a little time ago to the Harley-Davidson flat twin which took part in some trials in the United States. We are now able to give a few preliminary details of this interesting little machine, but at the present time the company cannot give any further information concerning it, and nothing is known as to how soon they will be in a position to supply to the public in Great Britain.

The makers claim that the engine attains the highest crankshaft speed of any petrol motor built. It has a roller-bearing counterbalanced crankshaft; the reciprocating parts are very light, and the valve action is exceedingly simple and very fast. Great trouble has been taken in making the machine silent, and particular attention has been paid to this point in the design of the valve gear.



The new Harley-Davidson flat twin. The rear wheel is quickly detachable, and 26×3 tyres are fitted.

No details are yet given as to the size of the machine or the actual weight of the machine. The flat twin engine, three-speed gear, and clutch are in one unit, and from the engine the primary drive is through spiral gears, and the final drive, which is by totally enclosed chain, is lubricated by oil from the crank case breather.

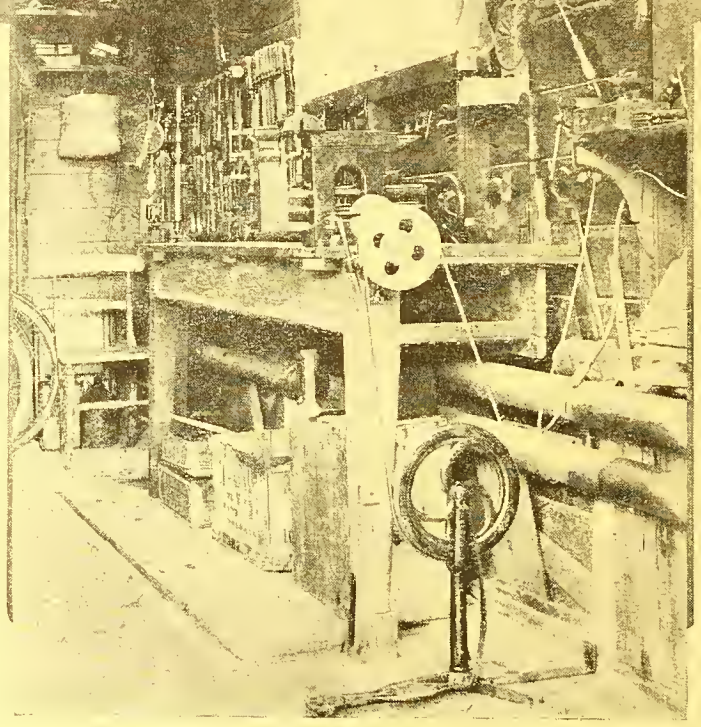
An important point is the simple detachability of the rear wheel, and it is only necessary to take off the back section of the chain case without disturbing the main case at all. The clutch is of the multiple type, with steel discs running in oil automatically fed from and returned to the engine.

The lubrication system is entirely automatic, and a mechanical oil pump supplies the engine, transmission, and clutch. A new type spiral-spring fork is fitted to this model.

The makers claim ample speed, excellent hill-climbing, and rapid acceleration, while the low centre of gravity, due to the engine position, makes this model exceedingly steady. It is interesting to note that 26in. × 3in. tyres are fitted.

This model makes the third opposed twin motor cycle to be marketed in the U.S.A., the Indian "light twin" and the Bayley Flyer being the other two.

THE MOTOR CYCLIST'S WORKSHOP AND ITS EQUIPMENT



An amateur's workshop. In the foreground will be seen the grinder converted to pedal drive, to which is attached the tool rest belonging to the Stewart Handy-worker. This latter tool is seen behind the grinder. Above the grinder to the right is a small gas soldering iron. The tools, neatly arranged at the far end of the workshop, are hung on an old door covered with American cloth The combined bench and breast drill is clamped on to a narrow extension of the bench

Helpful Advice for the Amateur Mechanic.

EVERY motor cycle house should also be a workshop. The enthusiastic amateur mechanic can derive almost as much pleasure from spending his leisure in keeping his mount in order as from actually driving it. It is an old saying that to do a job well one must do it oneself, and it is truer now than ever it was; in fact, at the present time, and for a period hence, it will be more correct to say—if you want to get a job done at all you must do it yourself. Many motor cyclists have in the past depended entirely on the local garage for the smallest repairs and adjustments, but such practice is full of disappointments.

Some people are born mechanics, some can become fairly skilful with practice, and some are perfect duffers and will remain so, but if the utmost pleasure and satisfaction are to be derived from the pastime the motor cycle must be understood and kept in the pink of condition, so every motor cyclist should aim at doing all he can to attain this object. The most expensive item in the repair bill is nearly always "men's time," and why this is so the novice is quite at a loss to understand, but let him try to do his own adjustments and he will soon realise how long it takes. It is well worth every motor cyclist's while to look after his own mount, and a few hints on workshop equipment will be of value.

The First Essentials.

The motor cycle house should not be too small. Usually it will just contain a sidecar combination and leave no room to walk round it, but it cannot be too large. It should be well lighted; there should be the ordinary window in front of the bench, and a top light above it. A shed which will just house a small four-seated car will leave ample room for a sidecar, a bench, lathe, and all that is necessary. The well-to-do

What to Buy. Necessaries and Luxuries.

amateur to whom money is no object can buy all he wants at once, but the average impecunious beginner should purchase his tools by degrees. It is quite surprising how much useful work can be done with a small vice opening to four inches, a few files, pliers, screwdriver, and some spanners. Later on a set of box spanners should be purchased. These are most useful, as they do not damage the nuts, and by means of them nuts which were formerly inaccessible are easily reached. Next in importance is a small bench drill, a useful tool which is of extreme value as the amateur increases in skill. One which will drill up to half an inch is best. The writer is at present using one which is a bench and breast drill combined. It is a most ingenious tool which will drill in any position, and is equipped with a table on the other side of which is a drill vice for holding the work. This latter fitment is practically indispensable, and one should always be bought with the drill.

The Necessity for Tidiness.

Another very useful tool is a carborundum grinder for sharpening tools and for doing numerous other jobs. The next and last important tool is a lathe which is only required by the advanced amateur mechanic.

Now, as regards the general arrangement of the workshop, there should be a place for everything, and everything should be kept in its place, as it is only by so doing that a tool can be found instantly when required. When doing a job there is a tendency to litter the bench with tools, with the result that there is no room to work, and the very tool required is often hidden. All tools not needed at the moment should therefore be replaced. The workshop should be kept tidy and cleaned up after every job, if possible, and

The Motor Cyclist's Workshop and its Equipment.—

the floor should be swept frequently. Often valuable tools and odds and ends are saved in this way.

It is best to keep the tools which belong to the machine quite separate from those which are kept in the workshop, so that no important essentials are left on the bench when they should be in the motor cycle toolbag, and the rider is thus prepared for any eventuality on the road. The collection of files may be acquired in easy stages. A half-round, a flat rather coarse file with a safe edge, a round file, and several knife edge files which are most useful tools not too well known among amateurs, are essential.

The accompanying illustration gives an idea of how the writer has fitted up his motor-house. The bench is made out of an old kitchen table dating from the sixties, which, being exceedingly strong, is admirably suited for the purpose. On it is fixed a Stewart Handy-worker, a most ingenious tool which is sold by the Cooper Stewart Engineering Co., who handle the Stewart speedometer. It provides an excellent vice opening to about five inches, an anvil of ample dimensions provided with a square hole in which may be inserted a cutter for severing iron bar up to, say, ¼in., a fitment to the vice for holding round articles, a grinder, a three-speed drill, and a special drilling table fitted in place of the anvil, which can be easily lifted off its bed. This tool is the latest addition to the writer's workshop, and had it arrived earlier it would doubtless have delayed the purchase of the bench drill and the carborundum grinder. This latter is a very useful adjunct, not only for sharpening tools but for grinding down metal too hard for filing, rounding off corners quickly, etc. Originally it was driven by a handle, which only allowed one hand for holding the work, so the handle was removed and an engineer friend made a pulley to fit in its place, while part of a discarded dentist's drill served as a treadle.

Originally the gear ratio between flywheel and carborundum wheel was something like 50 to 1, and the pedal would not drive at all. The difficulty was overcome by bolting on an aluminium speedometer pulley, which is a great improvement. One of the latest additions to the equipment is a set of taps and dies (Whitworth thread) up to ¼in., which are quite invaluable for overhauls and repairs. AILETTE.

A NON-RUSTING TOOLPROOF FINISH.

Details of an Interesting Treatment which eliminates Plating and is Durable.

IN the issue of October 10th our contributor "Ixion" makes the following statement: "No invention will be more heartily welcomed by motor cyclists than a method of finishing off metal surfaces which should be proof against rust, would stand up on such parts as nuts, which are subjected to tools, and would look tolerably decent."

This paragraph caught the eye of a very clever inventor, who has for some time been connected with the motor industry, Mr. A. P. Hanlon, of the Rustless Iron (Cowper-Coles Process), Ltd., Shepperton-on-Thames. He communicated with us, with the result that we paid a visit to his works and saw a process of treating finished iron parts which renders them quite impervious to the effects of moisture.

The process carried out by the Rustless Iron, Ltd., consists of low temperature heat treatment of steel and iron in contact with zinc, the result of which gives a slight penetration of the steel in the form of a rich zinc iron alloy, and in addition a hard, close-grained, but slight, coating. On machined parts, such as bolts and nuts, the coating is quite smooth, and has a silver grey matt appearance, but this can be polished until the surface presented is quite equal to nickel plating.

A micro-photograph, showing the penetration of the zinc into the iron.

The process is a most interesting one, as the finished machined work can be treated with practically no interference with the usual clearance, and fine screw threads are unaffected. It is, moreover, cheap, and if it fulfils all the claims of the firm (and we do not see why it should not), it should go a long way towards rendering the motor cyclist's lot much more easy than it is at present. It should be borne in mind that if a motor bicycle, of which the handle-bars, brake rods, gear rods, levers, and rims are all bright parts which are subjected to the action of the atmosphere, could be treated with a process of this kind, the machine could be washed down almost as a car, and, if the magneto were covered over, the wheels could be washed with a bucket of water and a spoke brush. The machine could then be used in all weathers, and would always retain a decent appearance, as rust would be non-existent. It seems, therefore, that a business such as this should have an enormous future.

We are shortly sending one or two tools, which are always exposed to the damp air, to be treated, and we shall watch the results with the greatest interest.

The finished work will not chip or rust after abrasion or denting, owing to the complete means of coating the article.

A micro-photograph distinctly shows the penetration of the zinc into the iron. First there is a coating of zinc, and next the zinc iron alloy, which forms the protection before the iron is reached.

The parts to be treated are thrown into a drum, and are there brought into contact with zinc powder. The drum is rotated at a very slow speed in a furnace for a certain length of time and at a temperature registered by a pyrometer. Many of the tools in the works have been treated by the men themselves, and though subjected to rough treatment, they are still in excellent condition.

AIT

CURRENT CHAT

Times to Light Lamps.

Greenwich Time.

Dec.	19th	... ...	4.20 p.m.
,,	21st	... ...	4.21 ,,
,,	23rd	... ...	4.22 ,,
,,	25th	... ...	4.23 ,,

Price of Petrol.

From January 1st the price of petrol will be reduced by 3½d. per gallon.

A Scout of Progress.

This appellation was given to our editorial representative by a well-known member of the trade.

A Black Book.

Who is the designer-motor cyclist who, during the war, has owned and run upwards of thirty different machines and entered their shortcomings in a little black book?

Imports and Exports.

During the month of November there were no motor cycles imported, and the value of imported parts only amounted to £491 as against £2,907 for November, 1917. There was also a big decrease in the exports, which are here tabulated.

Exports for November.

	1918	1917
Motor Cycles	£31,070	£122,713
Parts	18,531	32,894
Total	£49,601	£155,607

Contour Chasing.

A reader who is a lieutenant in the R.A.F. writes from the Front: "Your paper is immediately in great demand as soon as it appears in the mess, as I have it sent weekly. I am sure you would feel flattered if you saw the rush for it, and hot discussions sometimes arise out of your aviation section, which is jolly good. Personally, I prefer a good old motor bicycle to any aeroplane ever built, for flying is, to say the least of it, dull, except, of course, for contour chasing in a scout machine, which is great fun, but forbidden in towns or very thickly populated districts owing to the danger to the public."

Coincidence.

The great war was, of course, full of curious incidents, but few will beat that related by "Q." in a recent issue of the *Evening News:* "A young despatch rider some time back was dashing along a strafed road on his motor cycle, with a comrade in the sidecar. A shell dropped between them, and when the rider regained consciousness he found himself in hospital, bruised and suffering from shell shock, but otherwise unharmed. He recovered quickly and never reached Blighty, but failed to learn anything of the companion who had been so suddenly blown out of his 'ken.' A year later the rider again became a casualty, reached an English hospital, and was in due course passed on to a seaside convalescent camp. Entering a café in the neighbouring town, he sat down at a table, and found himself face to face with the former occupant of his sidecar, who had been more seriously hurt than himself. He had been sent home, and was now, like himself, recovering from a second dose of Hun frightfulness. Each till then had firmly believed the other to be dead!"

A Royal Air Force Motor Cycle at Work.

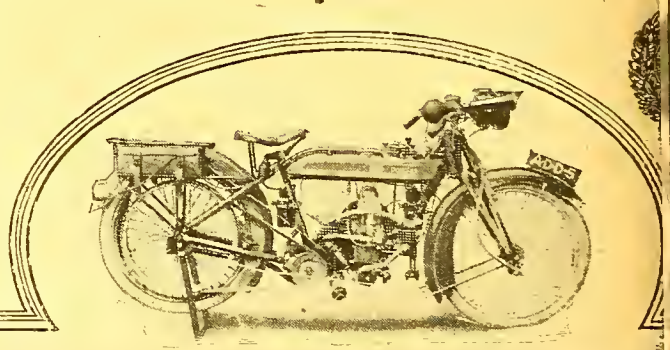
The above title is that of a full-pag picture in colours in a recent number *The Sphere*, from a painting by Ugo. The sub-title is, "A War-tim Scene in the Strand." The painte depicts a fair W.A.A.C. driving a Sta officer in a sidecar. The figures an colouring are excellent, and the mechanis is better drawn than is usual in picture of this description. The spring fro fork, however, is a little hazy in outlin and the engine, etc., are, perhaps wisel hidden by the shadow of the lady's coa

From Light Car to Cycle Car.

More than one firm whose belief wa before the war pinned to the large car a the only proposition worthy of thei serious consideration have been incline to the small, or lighter, car as their post war mainstay. Many firms of this typ have definitely committed themselves t catering for this market.

A New Proposition.

A London concern, hitherto associated exclusively with the light car, includes an entirely new proposition, which wil be so light in structure that it may be regarded as a cycle car. This will have four wheels, a "flat twin" air-cooled engine (89 × 107 mm., 1,331 c.c.), with aluminium pistons, shaft-cum-silent chain drive, and friction transmission. The weight of the complete chassis is said to be less than 6 cwt., and the car will be marketed as a two and a four-seater and a light van. The price is to be a "popular" one.



AN ARMY OF MOTOR C

These motor cyclists, who formed part of the R.E. Signal Depot, Dunstable, in 1916, are potential members of the proposed Despatch Ride discharge from the army, and indulge in pleasure riding on motor cycles of their own selection a

Manufacturers Freed.

The Minister of Munitions has issued an Order revoking the Order of 1917 which prohibited any person from carrying out without a permit any work connected with the manufacture or erection of any new or unused motor internal combustion engine designed or adapted for mechanical traction, or of any new or unused motor cycle, motor waggon, or traction, or other motor vehicle propelled by mechanical means.

One of the Old Brigade.

Until we caught sight of "Flossie" the other day we had not realised how starkly simple the old times speed machines were in comparison with modern motor cycles. The lady in question (her name was lettered in violent crimson on a rather battered tank) was leaning against a garage window. She was nothing more than a frame, a pair of wheels, a belt, and an engine. The two great bare cylinders were topped off by a few scanty radiating fins, and a remarkably workmanlike overhead valve gear.

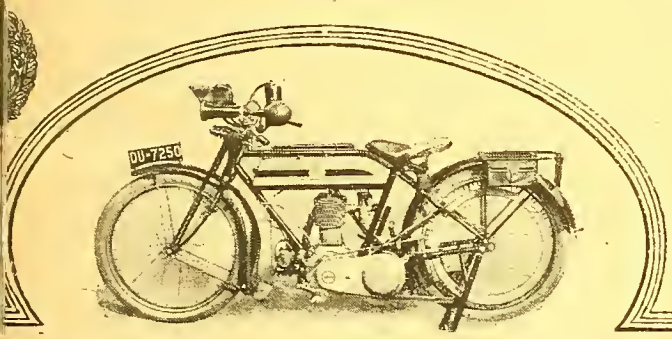
When her owner (an R.A.F. pilot some 6ft. tall) came out with a new plug for her he handled the great machine as easily as if it had been a baby two-stroke. After she went off, with that effortless, seven-league action that only a high-geared racing twin can give, we fell to wondering if all of the complications we regard as necessities now were indispensable. Many of the old brigade still hold that the high-powered single-geared 'bus is the most sporting machine of all to drive.

Second-hand Machines.

No fewer than 621 small advertisements were published in last week's issue. Prices are well maintained.

A Repatriated D.R.

One of the most stirring stories related by the repatriated prisoners of war arriving at Hull was that by Clement Fursdon, a motor cyclist despatch rider with the A.S.C. He had suffered torture at the hands of the Germans. The son of a Bristol manufacturer living in the Westbury Road, Durdham Downs, Bristol, he was a student when war broke out. He volunteered, and arrived in France on August 13th, 1914, with the old "Contemptibles." During the retreat from Mons he was despatched on a hazardous journey to a forward position. There was just the chance he would get through. Unfortunately he was surrounded by the Germans, but before he fell into their hands he set his machine alight and destroyed it. He was captured on August 31st, 1914, so that he has had over four years in captivity. During that period, he said, he made ten attempts to escape, and finally succeeded on November 10th. He has had long spells in German prisons. For twenty-one months he lingered in the fortress prison of Cologne. Nine months of that time he was awaiting trial on a charge of striking a German officer, for which he was sentenced to twelve months' imprisonment. Asked why he did this, Fursdon replied with some emphasis, "The man was brutally ill-using some of my comrades." The Germans surpassed themselves in brutality when they thrust him into a dark cell in which he could see absolutely nothing—this time for the alleged offence of insulting a German under-officer. He was kept there for seven days without water, and the only food he got was 2 lb. of bread. When he was released he was half dead.



ST DESPATCH RIDERS.

ub. A large proportion of them were recruited by *The Motor Cycle*. It is the intention of these enthusiasts to band together after their nct from the more serious side through which they have recently passed astride W.D. models.

CURRENT CHAT

Special Features.

CHRISTMAS TRIALS OF PRE-WAR DAYS.
AUTUMN IN THE OLD DAYS.
A MOTOR CYCLIST'S WORKSHOP.

Shellac Prohibition Removed.

The Minister of Munitions has issued an Order revoking the Shellac Control Order, which prohibited, except under licence, the purchase, sale, or delivery of shellac in quantities exceeding an aggregate of 7½ cwt. net weight per calendar month.

Coal Gas for Motor Vehicles.

The Gas Traction Committee has arranged a Gas Traction Section in connection with the forthcoming British Scientific Products Exhibition, to be held at Manchester from December 27th until the middle of January. The Executive Committee of the Automobile Association has therefore decided, by the special desire of the Gas Traction Committee, to postpone until January 31st the closing date for receiving entries for the Association's £1,000 Competition for the best method of using coal gas as a motor car propellant.

The conditions of the competition, also entry forms, may be obtained from the Secretary, Automobile Association and Motor Union, Fanum House, Whitcomb Street, London, W.C.2.

THE MOTOR CYCLE

AVIATION SECTION

A Matter of Moment.

The Great Problem—Latest News.

The Royal Air Force pale blue uniform having proved unsuitable for practical work, it has been decided to adopt a dark shade—approximately a "Navy" blue.

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Trophies for R.A.F.

Col. and Alderman Sir Charles Wakefield has presented two trophies, of the value of fifty guineas each, for annual competition in boxing among officers and men of the Royal Air Force.

—◇□◇—

Honours for Airmen.

In the list of Eton honours recently issued there were two D.F.C.'s and five A.F.C.'s. In addition there was a very considerable number of naval and military decorations that were awarded before the fusion of the air services.

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Germany's Air Strength.

On July of the present year the Paris *Excelsior* states Germany's Air Force included 1,530 chaser machines, 300 protecting biplanes, 1,020 reconnaissance machines, and 156 bombers. No fewer than 500 machines were lost between July 13th and November 11th, and she had to deliver 1,700 under the Armistice terms, which effectually precludes any possibility of future aggression in the air.

Sopwith Achievements.

Postponed.

The lecture on "Civil Aerial Transport," by Mr. Claude Graham-White, which was to have been given before the Royal Aeronautical Society on December 11th, has been postponed until after Christmas, owing to the General Election.

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To Bomb Berlin.

There are a few dissentients in the general chorus of thanksgiving over the Armistice, and conspicuous among them are the men who were detailed to bomb Berlin on November 11th with the new four-engined Handley-Page machines, complete with bombs of Brobdingnagian dimensions. Possibly the shuddering Berlinese had word of the matter; they seem to know everything!

—◇□◇—

Sopwith Achievements.

In the course of speeches at a "Sopwith" luncheon last week, it was mentioned that the latest Sopwith effort had been the new aeroplane fitted with an A.B.C. engine, capable of 156 miles an hour and of climbing 10,000 feet in 4½ minutes. It is also interesting to record that Major Barker in his famous fight with sixty Huns was using a Sopwith Snipe.

French Pilots' Futures.

From Private to Flight Commander.

Lt. Walter Hunt Longton, clever exponent of the Alldays motor cycle, has been promoted to Flight Commander. Longton was so keen on joining the Army when war broke out that when he found the vacancies were temporarily filled for despatch riding he paid his own fees to learn to ride a horse so that he could join the Yeomanry. Finding there was nothing doing exciting enough, he got transferred to the infantry, and was nearly ruined in health while out in Gallipoli.

—◇□◇—

French Pilots' Plans for their Future Careers.

L'Intransigeant, a Paris evening paper, has interviewed some of the leading French pilots as to their future careers. Fonck will possibly remain in the Army. Nungesser may go to the U.S. Erhlich will rejoin his father's business. Decoin may adopt journalism, but in any case remains a champion French swimmer. Viallet had an interest in a Russian factory; it has been destroyed, and he will probably become a journalist.

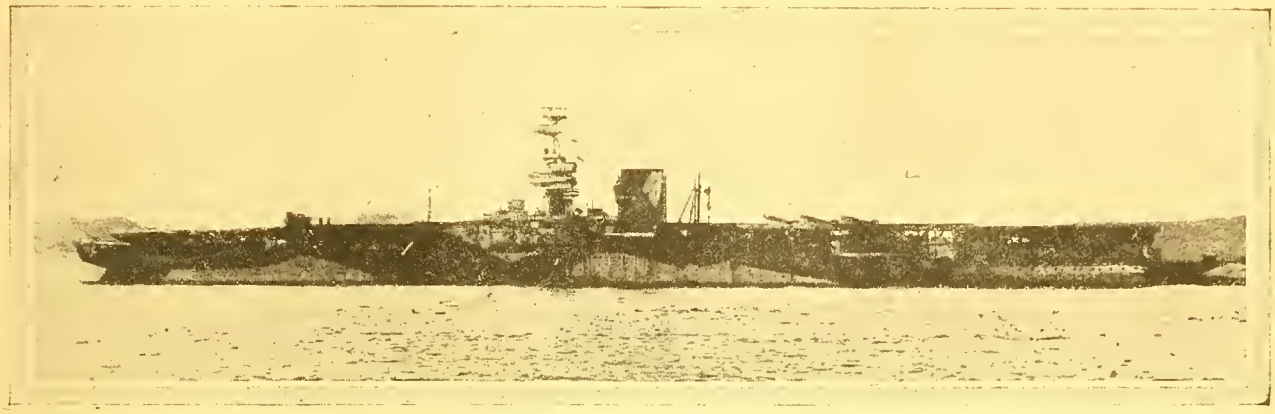
Lemaitre is taking up aerial transport. Marinovith is only twenty, and thinks he has time to reflect on his career.

An aeroplane about to start on its flight. The photograph was taken from a very unusual point of view.

NAVAL AIRCRAFT WONDERS.

Flying off Gun Turrets. Deck Landings.

The following article has been written by a member of our staff who, after seeing six months' ambulance driving with the French Army, joined the R.N.A.S., and was sent to H.M.S. *Furious*, the floating aerodrome. He is now teaching men to drive 20 h.p. Crossleys at the M.T. School of Instruction, R.A.F.



H.M.S. *Furious*, one of the "Hush" boats built to enable the Navy to make use of aeroplanes away from land. Her decks are constructed so that 'planes can successfully land on them.

SINCE the signing of the Armistice, the veil that shrouded the doings of the British Fleet and its composition since the beginning of the war has been somewhat lifted, and the public has been given a slight idea of the wonderful strides made in naval construction and strategy. Many references have been made to H.M.S. *Furious*, which is nothing more or less than a gigantic floating aerodrome, and it is the intention of the writer, who served on her as an R.N.A.S. rating, to give some of his impressions and experiences of naval aircraft work and *Furious* in particular.

The Metamorphosis.

Until the *Furious* was commissioned some eighteen months ago, the Navy had never attempted the construction of a large aeroplane ship, and even the *Furious* was not originally designed for the form she finally assumed. A number of passenger ships, such as the *Campania*, which sank in the Firth of Forth quite recently, had been converted into aeroplane and seaplane carriers, and had done a great deal of useful work. Aeroplanes and seaplanes could fly off the decks quite successfully, but until a ship could be built on which it was possible to land, the use of heavier than air machines at sea was always limited. Of course seaplanes cannot land on a deck, the usual procedure for them being to taxi along the water to the side of the mother ship and then be hoisted on deck. Until deck landing was an accomplished fact an aeroplane which flew off a ship had to make for the nearest land station to land or else "ditch" near a destroyer. In the latter case the pilot was saved after a ducking and the plane lost.

The *Furious* was designed as a special fast cruiser carrying a couple of 18in. guns—one forward and one aft. She finally left on her maiden voyage with one 18in. gun aft and a large hangar, on the top of which there was a flight deck forward. In this form she carried about four Short seaplanes and half a dozen Sopwith "Pups." There was no difficulty in flying either type off the deck, but the great idea was to land on the deck, and with this end in view some experiments were carried out at Scapa Flow in August, 1917. The first attempt was made by Flight Commander Dunning on a Sopwith "Pup." Needless to say he travelled in the same direction as the ship, which was moving at ten knots, and coming in on the port side made a fairly successful landing with the assistance of officers who, standing ready, rushed up and prevented the machine from going overboard. I cannot remember the size of the landing space—now the flying off deck—but it was very small and tapered forward over the bows of the ship. Dunning made a second successful landing, but in the third attempt he was killed through the machine not landing properly and going overboard. Thus one of the most daring pilots and best of officers lost his life for the advancement of flying.

After that no serious attempts were made at landing until the ship was altered, but much experimental flying was carried out and also a number of patrols and cruises with the Grand Fleet. It may here be remarked that the maximum speed of the *Furious* is much nearer forty-five knots than the thirty, as stated in the daily press. Her total length is somewhere in the neighbourhood of 900 feet, so that she is "some" ship.

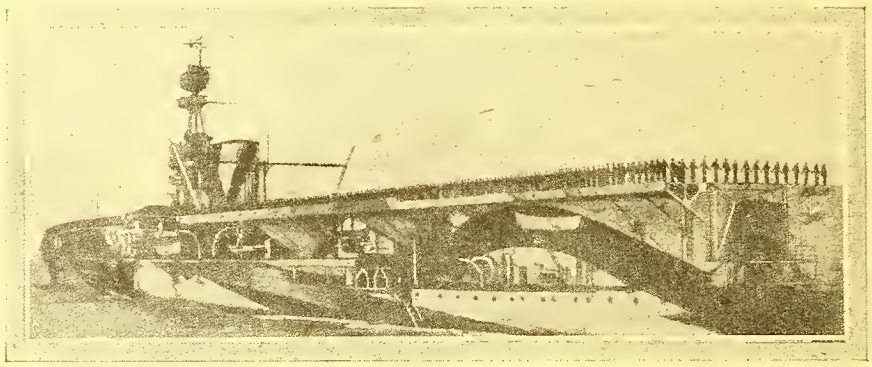
Seaplane v. Aeroplane.

Personally, I always thought that the seaplanes were more trouble than they were worth. They were difficult to manœuvre in the hangar and get on deck. There was a large hatchway aft of the flight deck (called now the flying off deck), and machines used to be hauled up and down by a derrick. The same derrick hauled up the seaplanes from the water when they had "taxied" up to the boom. It was always

Naval Aircraft Wonders.—

difficult to get the seaplanes hauled in, and one night when it was snowing hard and blowing hard, the derrick broke just as a Short was being lifted from the water over the deck and down into the hangar. It went just as the plane was about three feet above the deck, and it promptly went into the water in bits with two R.N.A.S. carpenters on the floats. Very many searchlights were immediately focussed on the spot, and the two men were rescued with minor injuries.

At the beginning of last winter the *Furious* went into dock for extensive alterations, and we got three weeks' leave, which was appreciated. She finally came out in her present form, the 18in. gun aft had been removed, and a large landing deck extending right over the quarter-deck and close up to the funnel. I think most of the R.N.A.S. boys were glad to see the last of the 18in. gun, as, though it was not often fired, it rather put "the wind up" us. The landing space is roughly 300 feet long by 100 feet wide, and there is a ledge about 18in. high all the way round. The two decks are connected by two narrow decks running each side of the funnel, and on these two decks the planes are quickly transferred by trolleys running on rails. Aft of the landing deck, and underneath it is a second hangar, and a power-operated lift is used for moving the machines from hangar to deck or *vice versa*. There is now another lift forward to serve the forward hangar and flying-off deck.



Some idea of the size of the flying-off deck will be gathered from the photograph. The landing space is about 300 feet long and 100 feet wide.

We now carried no seaplanes but "umpteen" aeroplanes, all with quickly detachable and attachable wings for moving from hangar to deck, etc. Unfortunately I left the ship in the middle of the various experiments that were being carried out to make deck landing an unqualified success. Various devices and patents, into the details of which it is inadvisable to enter, were tried, and many were the broken noses. However, it is now an accomplished fact, and the use of the aeroplane at sea is extended beyond measure. Improved ships similar to the *Furious* are no doubt under construction. Most light cruisers, battle cruisers, and battleships carry 'planes on their gun turrets. A small platform is erected just above the turret, the 'plane flies off the platform with a run of about fifty feet. Pilots can fly off the turrets, and then come back and land on the big floating aerodromes, such as the *Furious*. I believe the first pilot to do this was Squadron Commander Rutland, at one time a C.O. on the *Furious*, who flew off the after-turret of the *Repulse*. It is really a wonderful achievement.

C.F.H.

LES AS PEINTS PAR EUX-MEMES.

Review of an Interesting and Intensely Descriptive Book.

M. MORTANE'S new book, the title of which is given above (Libraire Alphonse Lemerre, 23, Passage Choiseul, Paris, four francs), illustrates the author's great power of evoking a picture.

"My round is finished, it is 18h. 30m. Since 16h. I have been struggling with violent eddies on a hot June afternoon. The air is calm now, and my observer, Garraud, and I abandon ourselves to the charm of the peaceful hour.

"We must think of returning. I head for the aérodrome, and perceive far off the little green square, cleft by the yellow road, and bordered by hangars.

"A surprise: coming from under me, a Nieuport biplane surges up, with the swiftness of a meteorite, hardly twenty metres below my fuselage. I see the back of the pilot and the face of the passenger covering me with his gun. *Diable*, if it had been a Boche! The Nieuport wheels about, to play in friendly fashion with our big Caudron, as a kitten with a mastiff. She approaches. Suddenly there is a rending smash from her propeller, a horrible crack. In a second of time the little scout has side-slipped into us, and is now hung on my left wing.

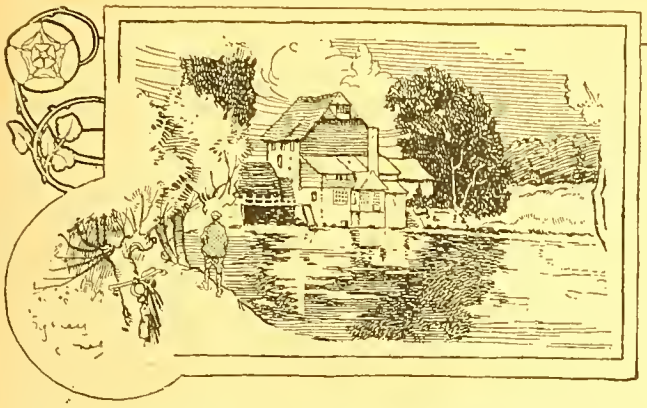
"My machine vibrates with the shock, and we commence to fall in an eddying spiral. I cut off my ignition and petrol quickly, feeling my controls, which will not answer. We spin down.

"Death is waiting, inevitable. Already I seem to feel the frightful shock of our landing—I shall not have the time to suffer—I shall be crushed by my engine. The terrible spectacle so often seen presents itself to me—precise, brutal, the poor shapeless *débris* in a network of wood, wire, and twisted metal—and my flesh shrinks at it.

"That is all that will be left of me in a few minutes, I who now am full of life and health. 300 metres, 200! It is the end. I feel quieter in the presence of the supreme *dénouement*. I hold the sides of the fuselage tightly and shut my eyes. A crash, a shock, a second of unconsciousness. Is it death? I open my eyes. I am all right—a white wall, on my left a treetop. Gently, fearfully, I move my limbs! Living! An immense joy floods over me. The tree has broken our fall, and all four are living. The crowd swarms round us, and I give myself up to an immense happiness, the joy of re-birth."

R.H.B.

BIS



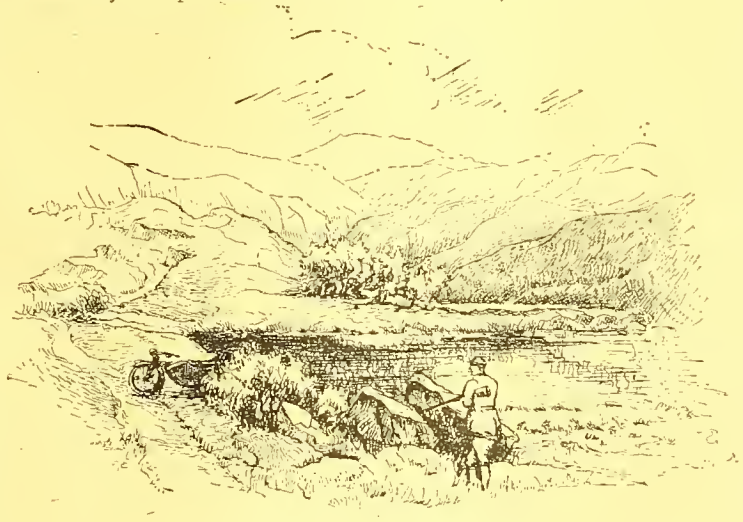
AUTUMN IN THE OLD DAYS.

A Motor Cyclist's Recollections of Days Spent with Rod and Gun.

"O FAINT departed days," as Bobby Burns might have said, when we gave the kick-starter a jab in the chilly dawn (I don't think), and with a little black spaniel huddled down in the foot of the sidecar, shivering partly with the morning chill and partly because his cold, wet nose was pressed against the stock of his satanic majesty the shot gun—when, with packets of sandwiches in our pockets (the string round which always came off ere we left home), we started out for some happy hunting ground and a day of absolute freedom.

The Value of the Heavy Sidecar Outfit.

I do not love heavy sidecar outfits, but for the sportsman they are the most useful machines ever invented—especially for those whose hunting grounds are in the mountains, and often partially inaccessible by car. I know anglers who take with them fly books and artificial baits enough to stock a museum, to say nothing about bottles and flasks, but an array of this kind merely bewilders the angler and puzzles the fish, and the first thing the motor cycle sportsman must learn to do is to cut down his gear to a minimum. Even then, though he may have plenty of room in the outward trip, he could generally do with an additional trailer on the way home.



In the dales with sidecar and gun.

A dog, a gun, an ample supply of cartridges, and a large net for covering the holes we cannot cover by shot and powder, comprise the outfit, and soon we are speeding out of the village away up the valley. Rabbits are always most plentiful "up" the valley, for it is there that the silting process of countless generations has reduced the hillsides to sand, in which element they can best hold their own against their many foes. Old James, the joiner, to whom a rabbitless world would be one not worth living in, waves us a cheery "good luck" from his cottage door, and soon the green fields, grey with mist and moist with dew, stretch to the heather line on either side. One recalls the scents that are abroad this time of day—the scents of refreshed hedgerows, of moist dust, of the dripping and decaying leaves, of the open fields or moorlands—reminiscent of the days when the world was young.

'Mid Crags and Torrents.

Away on the right there is the river, and occasionally we catch glimpses of it, narrowing as we proceed, till at length it is little more than a chattering, tumbling brook, with waterfalls here and there and still pools under the trees where the trout and grayling rise lazily at the blight that falls to the surface with the falling leaves.

The hills now are changed. We are no longer in a land of fertile valleys, where bracken, fern, and bramble are rank among the tree roots, and where the hills are capped with heather and giant crags. This is the land of wind—and winter. Here and there a struggling mountain ash, twisted and tortured by the gales, springs from among the rocks, but for the most part the mountain sides are a chaos of loose and shifting stones, the hilltops are mostly heatherless and rounded, and terrace over terrace, plateau after plateau, the limestone ridges extend into distance. It is rabbit country!

We turn along a winding track, and after a mile or so of jolting and bumping old Jack steps out from nowhere in particular and hails us. His gun is under his arm, his bag of ferrets in his hand, and the little black spaniel, seeing him, falls out of the sidecar with a whine of delight, drops on to its neck, and is lame for the rest of the day.

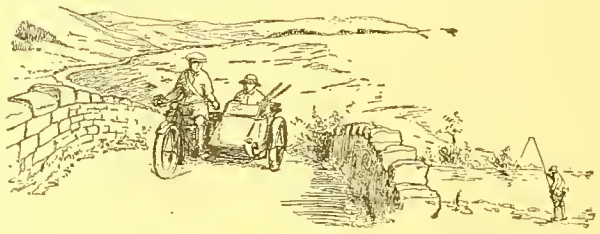
So much for the outward journey. To-day, alas, we are often up with the dawn, but it is generally the cold, grey, dreary side of dawn on an empty stomach. The old scents are in the air, but they are intermingled with the scent of disinfectant or burnt explosives, or of the chloride of lime covering the gas-shell holes, while the high-

Autumn in the Old Days.—

ways are thronged with dusty tired-eyed men—that ceaseless procession passing to and fro for four long years now—men who will tell you they never again want to see the day break, and as for the dews of morning—blime! ain't a warm bed and a dry blanket enough for anyone?

The Test of Keenness.

There is the first day of the season—always rather a bloody affair, for we are at our keenest and the rabbits are most plentiful. It is to be noticed that the keenness of sportsmen is always to be gauged by the length of time they take over lunch. In the beginning of the season lunch is a mere insignificant detail, but the advancing season increases its significance. We start with a packet of sandwiches and a flask; we finish with a number nine hamper and a demijohn. In the early days lunch is a ten minutes affair; later, in spite of the shortening days, it spins out to an hour; the really keen man gets bored and saunters off in search of a partridge, while he to whom a day with the guns is merely a form of outing goes to sleep under the wall.



Homeward bound.

A Heavy Load.

I recall one day when, owing to some error, the party set off and left me behind to bring up the rear with more than a fair share of the impedimenta. I was riding a 3½ h.p. 'bus at the time, with rather a neat featherweight sidecar attachment, and the load with which we found ourselves confronted consisted of a keeper, a dog, a bag of ferrets, two guns, and I fear to speculate how many rabbits, the interval having dimmed my memory. Anyway, it was not till that day that I realised what a dead weight rabbits are. I settled the gamekeeper with his guns and livestock, then proceeded to pack the rabbits in under his legs, over his legs—into every available nook and corner, while I watched the springs go down and down. We got home somehow, but the sidecar chassis was never quite the same again, and it is because adventures of this sort always occur sooner or later that I say cut your gear down to a minimum.

Marooned.

Some creatures possess the happy gift of profiting by previous experience, but the rabbit is not among them. For countless ages he has made his springtime home in the sandy banks of the rapidly running northern streams, and thither he takes his young when they are old enough to join the colony. For countless ages the springtime spates have flooded him out, drowning him veritably by the cartload—nine or ten sharing the same fate in a single burrow, all huddled at the end of it, till their retreat is finally cut off. The very fact that the banks of the streams they most frequent are of sandy formation shows that the stream itself is subject to sudden torrent, and in these regions the abundance or otherwise of rabbits in the autumn is decided by the abundance or otherwise of spates in the spring.

No only the rabbits are caught, however. Once my brother and I underwent an experience which caused us to take a solemn oath that never again would we give those mountain streams any rope. After lunch we decided to try our luck on the opposite side of the valley—a wild and lovely region, given over to the mountain sheep and moor game. One old road, terminating eventually at a long-abandoned lead mine, crossed the shallow stream, so loading the kit into a sidecar we set off—my brother bringing up the rear on a 2¾ h.p. Douglas. We got across all right, and enjoyed an hour or so of the best of sport, when suddenly my brother exclaimed—"Great snakes:—look at the river!"

The day had been dull and thundery, and looking down into the valley I saw that the river was about twice its normal width—a peat-stained swirling cataract which no sane man would attempt to cross!

If ever anyone was properly bottled we were! Dusk was near, to reach home or even civilisation meant crossing that stream, and there was no bridge for at least five miles. The road we were on petered out in the midst of No Man's Land: on either side was an interminable region of deep heather, behind us stretched a Labrador of desolation, which ended many miles away in quite a different country where the people almost spoke a different tongue.

The hour that followed was a pretty strenuous affair. Reluctant to leave our machines we pushed, shoved, and carried them through swamps, over crags—always making a bee line for the nearest gate till darkness came and put the stopper on.

Hiring the Gig.

In the end we *caché'd* our mounts and eventually reached an isolated inn, where we managed to hire a gig and the oldest horse I have ever seen. Its knees cracked, its shoulders literally squeaked, and it was obsessed by one desire—to fall down on the road and sleep. We managed, however, to wallop and coax it the nine remaining miles home, where we garaged it for the night in the empty motor house.

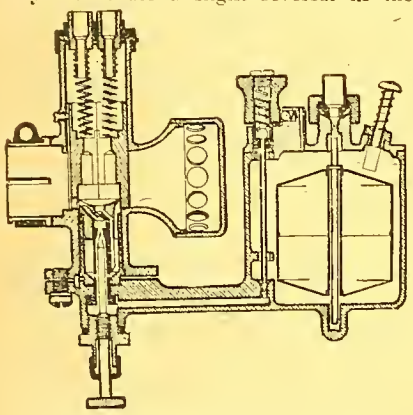
So much for a few brief recollections concerning the days when petrol and shot and powder could be had for the asking, and may they serve to recall the pleasant memories of others to whom the motor cycle is a doubly precious possession—opening up the way as it does to other sports and hobbies.

CHINOOK.

In quoting "American methods" as being desirable for the consideration of the British manufacturer, it is always assumed that the success of the former has been due to concentration upon one model, and that the Englishman's great fault has been in producing too many models. The success of the Indian cannot be attributed to this, as the Hendee factory has turned out as many different models as any English concern. In 1915 there were eleven different Indians.

A NEW MODEL SCHEBLER CARBURETTER.

THE new Schebler model AL is specially intended for use with lightweight engines of both two and four-stroke types. It is of the plain tube straight-through type, having the overhead feed to float chamber and a controlling adjustable needle valve from float chamber to jet sump. The jet orifice is also regulated by an internal needle operated by a milled head below. As will be seen from the illustration, the jet proper has a piece fitted over it forming a pair of tubes, one of which terminates on the inner or engine side of the main body, while the other leads from a kind of sump round the jet stem to the head of the jet. In operation at low speeds a vacuum is formed above the throttle, but is not strong enough to break the surface tension at the main jet. The side tube then comes into action, and operates till the air velocity is high enough to bring fuel from the main jet. This change over may also cause a slight reversal in the

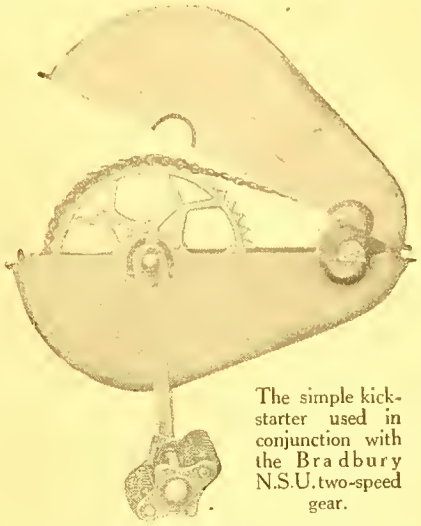


The new Schebler lightweight carburetter.

secondary jet. The combination of jets is said to produce a perfect proportion of air and fuel through a wide range of speeds, if the throttle is not suddenly thrown open from its closed position. If this happened, considerable misfiring would ensue; but the overflow sump, or reverse chamber, is provided with a kind of miniature wind scoop and two tubes of different lengths discharging into the main air stream. When running idly the sump fills from the main jet overflow, and upon throwing the throttle suddenly wide open this reserve is taken out of the acceleration tubes, as well as from the main jet. This acts as a temporarily large jet until one of the tubes is uncovered by the lowering of the level in the sump. Air is then drawn out through this tube, and acts in opposition to the air supply. This opposition causes a gradually decreasing petrol supply, and by degrees the whole duty devolves on to the main jet.

THE BRADBURY KICK-STARTER.

MANY of our readers who are using the Bradbury N.S.U. two-speed gear are aware that this useful little device is not usually fitted in conjunction with a kick-starter, and that this necessitates jacking up the back wheel and starting by means of the pedals, then placing the gear in neutral and letting down the back wheel on the road—a somewhat tedious process. Messrs. Bradbury and Co., Ltd., however, have overcome the difficulty by fitting a very simple form of kick-starter, which admirably fulfils the purpose for which it is intended.

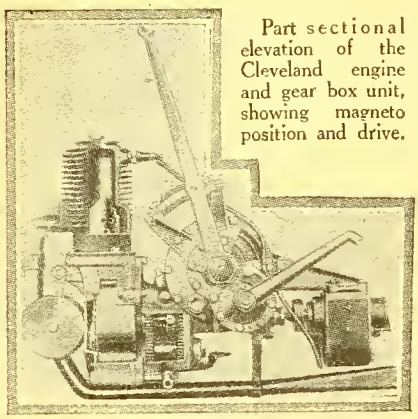


The simple kick-starter used in conjunction with the Bradbury N.S.U. two-speed gear.

This arrangement consists of a chain wheel and pedal, and the fitting of a special timing wheel provided with an extension for the purpose of carrying the free wheel. Both chain and chain wheel are compactly enclosed in a neat little chain case.

THE CLEVELAND LIGHT-WEIGHT FOR 1919.

THE Cleveland lightweight is a two-stroke of novel and interesting design, the engine being set longitudinally in the frame and directly coupled to the gear box, which is in one with the change-speed lever and kick-starter assembly. The 1919 specification is not much altered from last year's model, the only new features being freer saddle suspension, one-piece kick-starter, heavier stand, special Schebler carburetter, and longer wheelbase. The transmission from gear box to wheel is by chain, and the forks are a modification of the Triumph design. The new carburetter is operated in the unusual British style by two levers on the bars. The saddle suspension is similar to that once proposed for a well-known English machine, but abandoned as unscientific and anatomically wrong. The petrol consumption is given as seventy-five miles to the American gallon.



Part sectional elevation of the Cleveland engine and gear box unit, showing magneto position and drive.

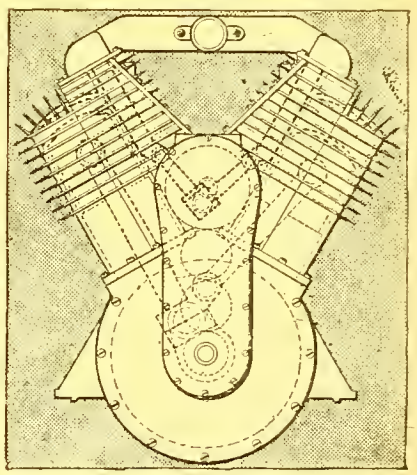
Summing up, the design of the power unit is very neat and compact, and seemingly fairly accessible, and the frame of sturdy construction.

Only this one model will be marketed next year, and the price at present is fixed at £45 in the United States, plus war tax.

A SLIDE VALVE ENGINE.

IT is almost generally acknowledged that the one drawback of the British motor cycle engine of conventional design is its tendency to be noisy at the valve gearing and tappets. To obviate this many designers have experimented with piston and sleeve valves in order to obtain the same degree of silence as is possible with a car engine. The poppet valve is still with us, however, and at the present time has held its position as the most serviceable type of valve for internal combustion engines.

Although designed as a cycle car engine, the Wilson motor illustrated here is interesting to motor cyclists if only because its size, the cooling system, and the disposition of the cylinders approximate to those of the big twin motor cycle engine.



The Wilson slide valve engine.

The Wilson engine has slide valves, which are operated by small connecting rods working on a crankshaft, driven by a train of gears from the main shaft.

As will be seen from the illustration, this type of valve makes for an extremely neat engine, and as there are only thirty-eight parts all told it should be inexpensive to manufacture. There are no springs or cams used and the valve motion is positive.

One connecting rod is connected to the main crank by a split big end bearing, the other connecting rod is jointed to the side of the other rod.

The engine illustrated has cylinders 88 × 93 mm. bore and stroke respectively, and the cylinders are set at an angle of 60°. Its weight complete is 95 lb.

THE SOCIABLE SIDECAR.

A Simple Solution of the Problem of Weatherproofing the Driver.

PROBABLY the sidecar owed its conception to the desire for sociability more than to any question of mechanics. Theoretically, the trailer is more mechanically sound than the most up-to-date sidecar, but if to-day we widened the track of a trailer and proved its stability and its mechanical principles superior to the popular sidecar, it would fail to appeal, because of that lack of sociability which condemned the tandem cycle car.

With many sidecars it is quite possible for the driver to converse with his passenger with a certain degree of comfort, but in the majority, owing to the different levels of the seat and saddle and their relative positions, conversation is almost impossible.

U and I sidecar on the road.

There is no doubt that the sidecar combination was the most popular vehicle on the road before the war, and there is every reason to believe that this popularity will increase when normal conditions return. The sidecar owed its popularity to its comparatively low cost, and the possibilities it offered as a companionable machine for two.

That it failed to fulfil every requirement of its users is manifested in the fact that many efforts have been made to give the driver the same protection from the elements as is enjoyed by the passenger. The cycle car, in fact, owed its conception only to this fault of the conventional sidecar combination. If the sidecar were perfect there would be little room for the cycle car.

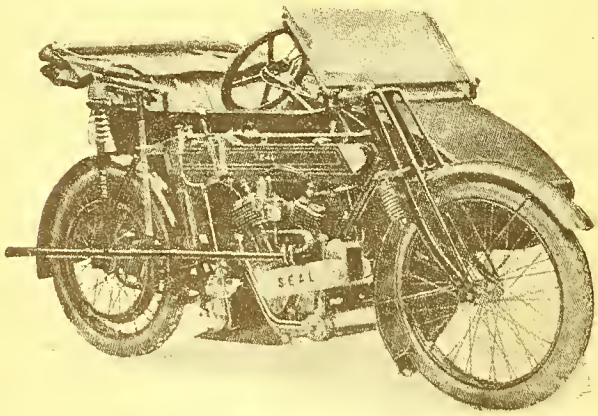
Concurrent with the advent of the cycle car, another type of hybrid came into existence, *i.e.*, the double-seated sidecar with steering mechanism arranged so that one of the passengers could control the machine. Several such attachments as these have appeared on the market, the best known of which was the U and I, which could be adapted to any existing machine without undue trouble.

It is perhaps unreasonable to expect too much from any proposition which is only an adaptation, but everything considered, the U and I type of sidecar offered very certain possibilities of development.

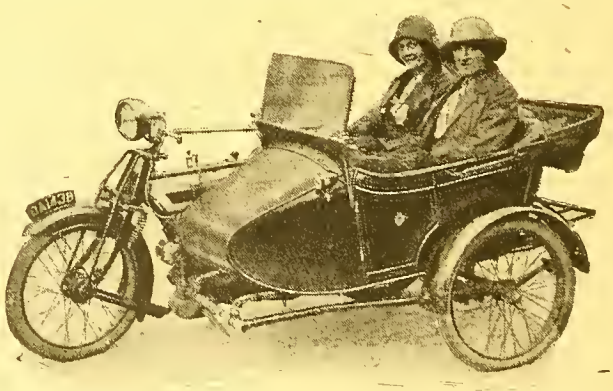
Since the war one well-known motor cycle manufacturer has introduced a sidecar on these lines which was designed and fitted throughout specially for the machine to which it was intended to be fitted. This was the A.J.S. Sociable of 1915, and it will be seen from the illustration that this machine was in no way deserving of the term "hybrid."

The two-seater sociable sidecar need be but little wider than the single-seater attachment, as the space between the body and the saddle can be used to advantage, therefore there is no reason why this type of vehicle should not ultimately become very popular among those who require a machine for two persons at a moderate price.

The question arises as to whether it is not advisable to build the cycle and chassis as an integral unit. That



The Seal patent two-seated sidecar.



A.J.S. sidecar for two. Its very neat appearance attracted favourable comment at the time of its introduction.

The Sociable Sidecar.—

many consider this desirable is revealed in the production of such machines as the Seal, Magnet, H.S.M., and Craven. It is strange but true, however, that immediately this is done the machine becomes a hybrid and difficult to sell, and a second question naturally follows as to the reason for not producing a machine following sidecar lines, but which is not a sidecar. Why not redistribute the material and make a three-wheel runabout of the Morgan type? Hence it would appear that the mere fact that the sidecar is detachable is an important one, and although it has been advocated that cycle frames and chassis should be built integral, it is the writer's opinion that to do so is to place the vehicle in another class—it passes from the top of one class and takes its place at the bottom of another. There are many who prefer a first-class motor cycle to a cheap car costing more.

Design the two units together by all means, but not as one machine. Then the machine can be sold for use as a solo mount, as an ordinary sidecar machine, or as a sociable. If it is built only as a sociable, the sale of the main element is restricted to one class of buyer. This is a trade policy matter, but it affects the buyer also, as a machine built specially as a sociable, and having a comparatively small output, must cost considerably more or be inferior to the article produced in larger quantities.

Further, designers of those machines which have been built as one unit usually have attempted too much, with the result that appearance has suffered for the sake of doubtful advantages. The fact that this type of vehicle has been developed so far should be a hint to designers of motor cycles to leave no stone unturned to make their machines more suitable for riding in all weathers. VEDETTE.

THROUGH FEMININE GOGGLES.

Experiences and Opinions of a Lady Rider. Points that will Need Attention in the Post-war Machine.

HOME ties in the form of a husband and wee daughter have prevented my joining those happy people who turn their pleasure to such good account in the W.R.A.F. and other branches of the Services—and incidentally serve to keep alive and strengthen the manufacturers' idea of the possibilities and requirements of the post-war market for ladies' machines—but an occasional peep at a 2½ h.p. two-speed Sun-Vitesse languishing in a garage revivifies memories of pre-war pleasures.

In those days I covered some thousands of miles on this machine, and, apart from small adjustments now and again, I never found it wanting—only once did I ever get stuck, and that was in the country far from telephone or station, and I made my return journey, motor cycle and all, perched on a huge steam waggon which happened along. This undignified experience occurred long ago, before I had learned even to diagnose a choked jet.

The writer on a 5-6 h.p. overhead valved N.U.T.

Somehow my experience with heavier machines has strengthened my preference for a lightweight which can be moved about without much exertion, for all ordinary purposes, and surely that is a good point unless one is a veritable tower of strength. For speed work or touring with a male companion on a road-burner something more substantial is requisite. Otherwise it is necessary to strike a happy medium and not to choose too flimsy a machine. A two-speed model is to be preferred.

To some lady riders it may seem a big disadvantage to have to paddle the machine in order to start, but, after all, it is an easy method, and, though maybe ungraceful, I always found my machine so quick to answer that in less time than it takes to tell I was away without the movement being noticed. No doubt a free engine is favoured by many, but for a novice a clutch is rather difficult to manipulate just at first.

I have had many happy rides on an open frame 3½ h.p. Royal Ruby J.A.P., but for fast riding I infinitely prefer the ordinary frame and semi-T.T. bars, appreciating the grip of the tank and more comfortable riding position. At the same time, from conversations with ladies who propose to have machines of their own after the war, I gather that a large percentage of them would honestly prefer an open frame model for a variety of reasons, and others would also prefer a real lady's model provided the rigidity and accessibility of the diamond frame type could be retained.

I never found it necessary to wear a special kind of divided skirt—being always perfectly at home in an ordinary skirt made generously wide so as to allow of easy mounting. I found it clung so much better, the other varieties of skirt being apt to flap in the machinery and belt, and develop a penchant for adhering to the hot cylinder.

A very important point, too, is the finish and mudguarding—particularly for those who have to look after their machines themselves. Cleaning the machine is a horrid job, and one which motor cyclists of my sex are very liable to neglect.

Doubtless, however, the manufacturers have somewhere tucked away plans for models that will cater for every class of lady rider awaiting the days of petrol plenty and Olympia Shows. M.W.

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address

THE A.B.C. CYCLE CAR

Sir,—I notice that in the article on the A.B.C. cycle car in your issue of the 5th it is said that the diagram shows the discs in the forward drive position. I note that the engine-shaft revolves in an anti-clockwise direction. If this is really the case, I should like to know what reason can be assigned to this departure from common usage. E.W.B.

Calne.

Sir,—I note with the greatest interest the advance notice of the above in your issue of the 5th inst., and imagine the vehicle should sell like hot cakes.

May I suggest that I hope the makers will not spoil the ship for a ha'porth of tar, but will include detachable interchangeable wheels (*vide* G.W.K. *pre-war* model) and dynamo lighting set, even by adding £10 to £20 to the proposed price, which will still knock out the 8 h.p. sidecar.

The lighting set might be an *optional* extra, but the wheels a standard fitting. H. G. M. HOBBS.

WANTED, A NON-RUSTING FINISH.

Sir,—It is not generally known that the Coslett process, which is now of world-wide repute, was in the first instance taken up by the cycle and motor industry. The Ariel Works were amongst the earliest pioneers in introducing Coslettising to the trade.

The frames and all the enamelled parts of Ariel cycles and Ariel motor cycles undergo this special process before enamelling, which renders them perfectly rustless, and Ariels have been treated in this way for a number of years.

The great merit of the process for the protection of cycles consists in the chemical combination of phosphorus and the steel article itself, together with a very slight deposit of iron and other phosphates. This changes the exterior of such articles as cycle frames, and forms a rustproof surface admirably adapted not only for the application of enamel, but also for preventing blistering and undercutting so frequently seen on enamelled cycles which are not Coslettised.

The Coslett Syndicate since their early days have made big strides in all directions, and during the present war have done a very large business with all kinds of munitions, both military and naval.

It is of interest to note in this connection that the famous depth charges so fatal to submarines are Coslettised, by order of the Admiralty. ARIEL WORKS, LTD.

1919 MODELS.

Sir,—Is it not distinctly misleading to offer a 1919 model motor cycle in 1918? The advertiser would doubtless say that the machine offered was identical with what the firm intends to sell in 1919. However, everyone does not know that, and, in purchasing, would imagine he was securing something particularly new and up-to-date. As a matter of fact, most motor cycles and cars built in 1914 are 1919 models, but it is distinctly misleading to refer to them as such.

Supposing the motor cycle were as standardised as the bicycle in pattern, would it be considered cricket to describe a bicycle built in 1905-6 as a 1919 model?—Such methods savour of second-hand furniture dealing, and I recommend the offenders to read and digest "Quinney's." They may miss the point even then FAIR DO'S.

HOW MANY SPEEDS?

Sir,—The question of "How many speeds?" seems to crop up very often. The question undoubtedly has many points of view.

Take the case of the heavyweight speed merchant. One speed, ratio of about $4\frac{1}{4}$ to 1, with a clutch, suits him excellently.

Now the heavyweight combinations undoubtedly want three speeds, two high ratios and a low one; gear ratios of about $4\frac{3}{4}$ to 1, 7 to 1, and 11 to 1.

The middleweight combination could well do with four speeds to facilitate fast hill-climbing; gear ratios of 5 to 1, 7 to 1, 9 to 1, and 13 to 1.

The middleweight h.o. engined solo machine should have four, though the lowest gear is very seldom used. The ratios should be $4\frac{1}{2}$ to 1, $5\frac{3}{4}$ to 1, 7 to 1, and 10 to 1.

The lightweight machine really only needs two speeds, though three would be a decided advantage for hill-climbing.

The question of "How many speeds?" really resolves itself into a case of "every man to his own taste." R.N.

LEAKAGE OF MAGNETISM.

Sir,—Reference to Mr. W. Alexander's letter, in your issue of December 5th. It was mentioned in the lecture on B.T.H magnetos, published in *The Automobile Engineer* during 1917 (I have not the exact dates, etc., by me), that phosphor-bronze base plates and straps were essential, as it was found by experiment that serious loss of magnetism occurred with steel or iron base plates and straps. I believe 12% was the figure given.

CORPORAL-MECHANIC, R.A.F.

Sir,—I am greatly interested in the correspondence on leakage of magnetism that has appeared in your columns from time to time.

I also have a Dixie magneto on my 2¾ h.p. Douglas, and the gear wheel on the armature spindle is very strongly magnetised, even to its periphery. The wheel is approximately 2⅝in. in diameter. When the construction of the armature and spindle is taken into consideration, it will be seen that the spindle must of necessity become magnetised. I, too, have experienced a falling off in power and an increased difficulty in starting off at times. It would be interesting to know what the makers of the Dixie magneto have to say about the *steel* gear wheel.

I think of putting a brass or gun-metal one on my magneto, and in the meantime hope to see further correspondence on the subject. LEAK OR NO LEAK.

Croydon.

THE COMING CYCLE CAR.

Sir,—With no little concern I have read the views of your previous correspondents upon the production and requirements of the future cycle car, and I venture the opinion that what may safely be designated a "light car" does not necessarily imply the production as a "cycle car." To my mind there is the difference that the horse-power of the latter should never reach the second figure, or it forfeits all claim to meet the requirements of those whose ideals are embodied in a machine which, whilst giving the principal benefits of a car, still retains the propensities of a cycle.

Nor do I think its perfection should necessitate the adoption of that mass of intricacies involved in the fitting of an electric starter and a three-speed gear box. Rather would I pin my faith in the belief that the direct drive with a single drop for hill-climbing, combined with a free engine and reverse, would ultimately suffice.

The effort to eliminate that multiplicity of components which encumbers some of our present productions and recourse to modern productive methods would enable the manufacturer not only to intensify his output and reduce the cost, but would put upon the market a machine that would be an inducement to those who had hitherto regarded such a thing as entirely beyond their province.

To the fear that has been expressed as to whether British home markets are big enough to permit of mass production on a scale sufficient to cut prices appreciably, we must not overlook the fact that that same question automatically presents itself at the conception of every effort to anticipate some public requirement. FRANK McKERNAN.

STRAIGHT TUBE FRAMES.

Sir,—Your rough outlines of the A.B.C. post-war designs of motor cycle and cycle car will strike the majority of the public very favourably, I am sure. Also, the publication of them gives one a very hopeful idea of the future of Britain's motor trade in these commodities. But there appear to be very controversial points to be raised in connection with the frame design.

Mr. Bradshaw "denounces the fetish of the straight tube frame . . . holds that a rigid frame holds the road badly, and is apt to fracture when the tubes butt into lugs unless these parts are built absurdly heavy." The Scott is a rigid frame straight tube machine, but is universally acknowledged to be one which holds the road well.

Anyway, the solution of this should rest entirely on the design of the front and rear springing and on the position of the centre of gravity.

I think I am safe in saying that the tubes in a straight tube frame are only apt to fracture where the tubes butt into lugs, when those straight members are not arranged in a truly triangulated manner, nor duplicated for the sake of lateral stresses. If these members are not properly triangulated—and they very seldom are—the joints become of more importance than hinges, and the lugs have to be heavy. Bending stresses are set up, and they crystallise and eventually break at the lugs.

So the straight tube frame is only a "fetish" when the members are unscientifically arranged, which is the usual thing. It has been demonstrated on several occasions in the pages of *The Motor Cycle* that proper triangulation is perfectly feasible and convenient, both for motor cycle and cycle car frames. The Scott three-wheeler may be submitted as a practical example of the latter.

Now, Mr. Bradshaw's projected frame appears to consist—viewed laterally—of a five-sided figure. Imagine each corner to be a hinge and the importance to be placed on the strength of the bends is obvious. Mr. Bradshaw evidently intends to reinforce these bends and yet allow a certain amount of spring to take place. Tubular linings unbrazed or unsoldered which are thinned, serrated, or corrugated at the ends for resiliency, have not proved satisfactory in certain aviation bench tests owing to distortion.

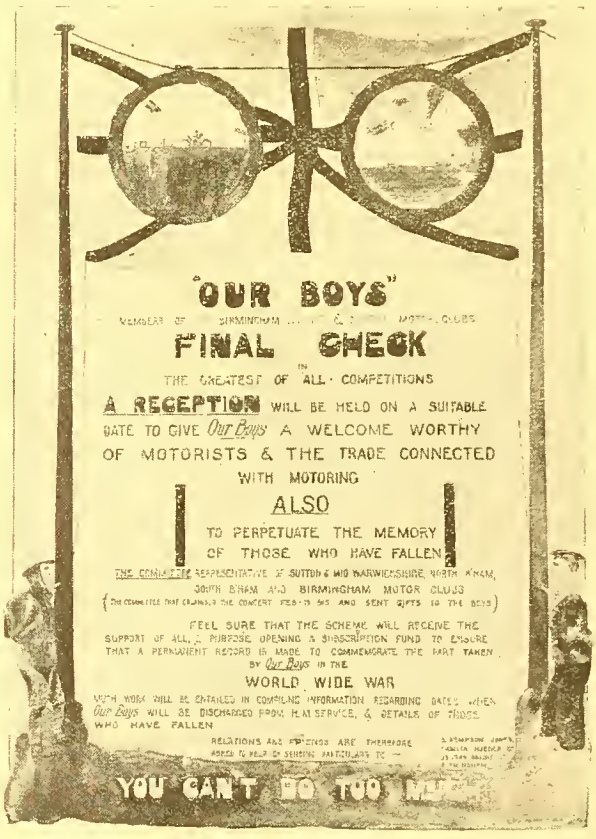
So it would appear that where the linings or outer reinforcements leave off a fairly sudden alternating bending strain will take place in the tubular member, which must tend to crystallise it in time, even if made of vanadium steel.

R. M. WIGG.

WELCOMING THEM HOME.

Sir,—I thank you for your notice in *The Motor Cycle* of November 28th in connection with the allied motor clubs of Birmingham.

The accompanying is a photograph of the poster to be exhibited at the Wheel Club, Birmingham.


"OUR BOYS"
FINAL CHECK
IN
THE GREATEST OF ALL COMPETITIONS
A RECEPTION WILL BE HELD ON A SUITABLE
DATE TO GIVE Our Boys A WELCOME WORTHY
OF MOTORISTS & THE TRADE CONNECTED
WITH MOTORING
ALSO
TO PERPETUATE THE MEMORY
OF THOSE WHO HAVE FALLEN
JOHN BRAM AND BIRMINGHAM MOTOR CLUBS
WORLD WIDE WAR
RELATIONS AND FRIENDS ARE THEREFORE
YOU CAN'T DO TOO MU

The "Welcoming Them Home" poster exhibited at the Birmingham Wheel Club.

Alec Ross is, of course, well to the fore in the scheme, plus Arthur Butterfield, Frank Whitworth, Howard Smith, Jimmy St. John, Bob Duke, P. J. Evans, S. Rodway, and S. Upton.

There is good evidence that the committee will be well supported by the trade, and all are keen to make the affair eclipse previous efforts—a £1,000 subscription list being considered well within range. S. KEMPSON JONES.

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Hub Lubricant.

What is the best grade of oil to use for the hubs of a two-stroke? What is the best oil to use in a U.H. magneto, and how often should it be oiled?—B.R.

The best *oil* you can use is engine oil, but better still is Prices' hub lubricant, which is put into the hub when warm and then becomes semi-solid, thus lasting a longer time. The magneto does not require oiling, as the bearings are packed with grease which lasts for years.

Some Norton Queries.

(1.) Will you please tell me the method of attachment of the rear coupling of the Norton sidecar? Is the coupling in one piece with the chassis, or is there a coupling which bolts through the special lug at the rear fork, and then the chassis bolted to this? (2.) Why does Mr. Norton not fit adjustable tappets? There is just clearance, and no more, at the tappets of my "big four" Norton, less than the thickness of an ordinary visiting card: is this enough? The compression is good even with the engine hot after a run. (3.) I should also be glad of your opinion as to the cause of my engine knocking. When running with the throttle just open in second or top gear the engine is quite silent, but as soon as I commence opening the throttle the engine knocks. The knocking always occurs when changing from second to top, however fast I run the engine before changing up. Magneto timing appears correct, with spark lever fully retarded points just breaking at top of stroke. The carburetter is a B. and B. semi-automatic variable jet; size of jet .045. Retarding the spark or closing the air has no effect on the knocking.—L.M.D.

(1.) The rear coupling of the Norton sidecar is made through a special piece bolted on to the frame at the junction of the back and fork stays. A hole through this takes a special taper plug, to which the sidecar chassis is bolted. (2.) Messrs. Norton do not consider adjustable tappets necessary, as there are no small parts in the timing gear to wear, and they have had no cases of valves stretching or breaking. In view, however, of the number of requests regarding this point, they are considering its adoption on post-war models. The clearance on your machine is ample, as proved by the fact that the compression is good when the engine is hot. (3.) The knocking trouble is due to too weak a mixture, and can be cured by raising the carburetter needle about a sixteenth or till the knock disappears.

How to find the C.C.

(1.) How does one find the cubic capacity of a motor cycle cylinder? (2.) Where is the magneto situated on a rotary engine?—J.D.

(1.) The cubic capacity of a motor cycle cylinder is found by working out the following formula: $D^2 \times .7854 \times S$.
D = diameter of cylinder.
S = stroke.
(2.) The magneto on a rotary engine is usually bracketed on a casing outside the crankshaft, and is stationary.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication.

ILIFFE & SONS LTD.

Magneto Trouble.

I have bought a second-hand U.H. 45° magneto. It was catching a bit in the armature tunnel, so I eased it a trifle and made it free, and can get a good spark when I turn it round by hand. I have coupled it up to a 5-6 h.p. twin, and drive it off the 2 to 1 shaft, with two nine-tooth wheels, and got no spark. I then put an eighteen-toothed wheel on the camshaft, and still got no spark; but as soon as I take the chain off and turn the magneto by hand I get a good spark. What is the cause of the trouble?—A.J.B.

You should, in the first place, see that the magneto is timed correctly, and that it is driven at half crankshaft speed; that is to say, if it is driven off the 2 to 1 camshaft two equally toothed wheels should give you the desired result. If the magneto gives a good spark when the armature is rotated by hand it should certainly do so when on the machine, provided the current is not leaking to earth in any way, and that the armature-shaft is rotated sufficiently fast.

Friction Drive.

I am desirous of converting a small 8 h.p. cycle car from ordinary gear box drive to friction drive, and would be pleased to receive your expert advice on the following points: (1.) Would a 12in. diameter friction disc driving a 12in. friction wheel be satisfactory? (2.) Would Ferodo ½in. wide do for the friction wheel?—B.S.

(1.) We do not think you would serve any useful purpose by converting your change-speed gear box, which is known to be satisfactory, to a friction drive, of which, so far, you apparently know nothing. If, however, you decide to make the conversion we think you would get too much wear with a 12in. diameter friction wheel. The friction wheel and disc, therefore, should be about 18in. in diameter. (2.) The most satisfactory material with which to edge the friction wheel would be cork.

RECOMMENDED ROUTES.

BUCKINGHAM TO NUNEATON.—B.A.

Buckingham, Akeley, Towcester, Daventry, along Watling Street, through High Cross, branching off just south of Hinckley, for Nuneaton, or you may take the first turning to the left after leaving High Cross.

EDINBURGH TO EXETER.—L.W.G.A.

Edinburgh, Penicuik, Leadburn, Rommano Bridge, Broughton, Moffat, Beattock, Lockerbie, Gretna Green, Carlisle, Penrith, Kendal, Lancaster, Garstang, Preston, Warrington, Wigan, Tarporley, Whitchurch, Hodnet, Wellington, Bridgnorth, Kidderminster, Worcester, Tewkesbury, Gloucester, Stroud, Nailsworth, Bath, Wells, Glastonbury, Bridgwater, Taunton, Wellington, Cullompton, Exeter.

LEWISHAM TO LLANDUDNO.—A.H.L.

Lewisham High Street, Queen's Road, Peckham Road, Church Street, Coldharbour Lane, Brixton Road, Acre Lane, Clapham Park Road, Battersea Rise, Upper Richmond Road, Richmond Road, over Kew Bridge, Brentford, turn right and then left for Ealing. Here you are on the main Oxford road, which follow through Uxbridge, Beaconsfield, High Wycombe, West Wycombe, Wheatley, Islip, Bletchington, Enstone, Chipping Norton, Moreton-in-the-Marsh, Broadway, Evesham, Wyre Piddle, Worcester, Kidderminster, Bridgnorth, Much Wenlock, Shrewsbury, Burlton, Ellesmere, Wrexham, Mold, St. Asaph, Rhyl, Abergele, Colwyn Bay, Llandudno.

First in the Field and Foremost ever Since

Convincing Proof that

C.A.V. Magnetos
BRITISH THROUGHOUT

are the most reliable in the world is supplied by the fact that by far the greater number of machines in use by our Dispatch Riders at the Front are C.A.V. equipped

C.A. Vandervell & Co. Ltd.
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Exclusive Agencies:

TRIUMPH	**MATCHLESS**	**NORTON**
A.J.S.	**ROYAL ENFIELD**	**ZENITH**
P. & M.	**ROVER**	**LEVIS**
INDIAN	**NEW IMPERIAL**	

NEW MACHINES

NEW MACHINES.

Definite contracts now fixed for the following makes—delivery of the new models approximately as stated :

Allon, Ariel, B.S.A., Diamond, Calthorpe, James, Levis, Matchless, Morgan, New Imperial, Rover, Royal Ruby, Zenith-Gradua, L.M.C. All the above can be delivered either this month or January, provided the order is definitely placed NOW.

A.J.S., A.B.C., A.B.C. Cycle Car, Enfield, Edmund, Harley-Davidson, Indian, Henderson, Humber, Hazlewood, Norton, O.K., I.O.M. Rudge-Multi, British Excelsior. Contracts for all the above already settled, but delivery will probably not be till after January. Orders booked for delivery in strict rotation.

Douglas, Sunbeam, Triumph, P. & M., Sun-Villiers, Clyno, and others. Definite contracts will shortly be fixed, and orders can be accepted for earliest possible delivery.

ORDER NOW is our advice, as otherwise you probably will not obtain. We book orders on the following terms :

(*a*) We require a deposit of £5 with order.

(*b*) We can HIRE you a second-hand machine, at from 10s. per week, until your new machine is ready.

(*c*) We can arrange exchanges, and quote you a definite exchange price NOW, and you can keep and use your old machine until the new one is quite ready for you.

SECOND-HAND MACHINES.

Even though our sales have trebled since the Armistice, we can still offer the BEST SECOND-HAND SELECTION in London. We anticipated the Armistice, and we can safely say that we shall be able to keep up our stock during the coming year. The firm with an empty showroom may have done good business last week, but they cannot do good business this week. *We* intend to do good business *every* week, and still keep a full showroom. Remember the terms of our second-hand dealings :

(*a*) Your money back in full without question within three days of purchase if not satisfied.

(*b*) Your machine exchanged free of charge at full price paid within three weeks of purchase if not satisfied.

(*c*) A three months' guarantee with every machine sold —the same guarantee as the makers give.

As "OLD BILL" said, "If you knows of a better 'ole, go to it," we say, with every confidence, "If you can get better terms or better treatment elsewhere, either as regards New or Second-hand Machines, then go elsewhere, and let us know where you go, so that we may go there, too." Next week we hope to publish a selection of testimonials received since the Armistice only, not three-year olds.

SELECTION FROM STOCK.

(a) NEW MACHINES actually in Stock.

CALTHORPE, 2-stroke, 2-speed	£42 0
CALTHORPE-J.A.P., 2-speed, clutch, 2¾ h.p.	£47 5
CALTHORPE-J.A.P. 4-5 h.p. Combination, 2-speed, clutch	—
B.S.A., 4½ h.p., 3-speed, chain-cum-belt	£79 16
JAMES 4½ h.p. 3-speed Combination	£99 0
JAMES 5-6 h.p. twin 3-speed Combination, 28in. wheels	£104 0
JAMES, 3½ h.p. twin, 3-speed	£79 0
JUNO-VILLIERS, 2-stroke, single-speed	34 gns.
JUNO-J.A.P., 4 h.p., Sturmey 3-speed countershaft gear	72 gns.
MATCHLESS Victory Model Combination, 28in. wheels and spare	£140 0

(b) SECOND-HAND GUARANTEED MACHINES.

ARIEL, 1916, Military Model, 3½ h.p., 3-speed	62 gns.
BAT-J.A.P. 1914 6 h.p. 3-speed coach Combination	49 gns.
CALTHORPE-J.A.P., 1916, 2-speed, clutch	33 gns.
CALTHORPE-J.A.P., 1915, 2-speed, clutch	29 gns.
CALTHORPE, 1915, 2-speed, 2-stroke	27 gns.
CONNAUGHT, 1916, 2-speed, 2-stroke	27 gns.
ABINGDON KING DICK 1916 6 h.p. 3-speed Combination	89 gns.
DOUGLAS 1916 4 h.p. 3-speed Combination, as new	89 gns.
DOUGLAS, 1915, T.T., 2-speed	48 gns.
DOUGLAS, 1914, T.T., 2-speed	38 gns.
ENFIELD, 1916, 3 h.p., 2-speed, clutch	39 gns.
HUMBER, 1918, 6-8 h.p., water-cooled, Cooper de Luxe Sidecar, unscratched	105 gns.
HUMBER 1918 6-9 h.p. water-cooled Combination	92 gns.
HUMBER 1918 water-cooled Combination, spare wheel	89 gns.
HENDERSON, 1915, 8-10 h.p., fine Sidecar, as new	95 gns.
IXION, 1917, 2-stroke, single-speed	25 gns.
IVY, 1916, 2-stroke, single-speed, as new	29 gns.
INDIAN, 1915, 7-9 h.p., 3-speed, khaki finish	50 gns.
INDIAN, 1916, Powerplus, 3-speed, T.T.	69 gns.
INDIAN, 1916, Powerplus, touring, as new	72 gns.
JAMES, 1916, 3½ h.p., twin, 3-speed	52 gns.
LEVIS, 1916, Popular	23 gns.
MATCHLESS, 1914, 2¾ h.p., T.T.	27 gns.
MATCHLESS, 1914, 6-8 h.p., T.T., 2-speed	39 gns.
P. & M., 1915, 3½ h.p., Canoelet Sidecar	65 gns.
RUDGE-MULTI, 1915, 3½ h.p., standard	43 gns.
RUDGE-MULTI, 1916, 3½ h.p., standard	49 gns.
NEW HUDSON, 1916, 2-speed, 2-stroke, as new	32 gns.
NEW IMPERIAL, 1916, 2-speed, as new	32 gns.
QUADRANT, 1914, 4½ h.p., 2-speed, clutch, re-enamelled	32 gns.
RUDGE, 1913, T.T., clutch, fine order	27 gns.
SCOTT, 1912, 3¾ h.p., 2-speed, clutch, kick-start	28 gns.
SERVICE, 1916, 2-speed, 2-stroke, Peco engine	29 gns.
SUNBEAM, 1915, 6-8 h.p., 3-speed, Gloria Sidecar	89 gns.
SUN-VILLIERS, 1915, single-speed, 2-stroke	22 gns.
TRIUMPH, 1913, T.T., clutch	26 gns.
TRIUMPH, 1914, special competition J.A.P. engined	35 gns.
WOLF, 1916, 2¾ h.p., 2-speed, 4-stroke	29 gns.
ZENITH-GRADUA, 1917, 6 h.p., countershaft, as new	76 gns
HUMBERETTE, 1915, 8 h.p., air-cooled, sporting streamline body, disc wheels, very smart	98 gns.
MORGAN, 1915, Grand Prix, water-cooled J.A.P.	115 gns.
CARDEN MONOCAR, 1915, de Luxe, 2-speed, repainted	59 gns.

For cheaper machines, see "Miscellaneous Advertisements."

(Any machine sent on "The Motor Cycle" deposit system.)

RIDER TROWARD & CO., 31, 40B, & 78, High St., HAMPSTEAD.

SECOND-HAND MACHINES

In answering this advertisement it is desirable to mention "The Motor Cycle."

MISCELLANEOUS ADVERTISEMENTS.

PRICES.

ADVERTISEMENTS in these columns —First 12 words or less 1/6, and 3d. for every two words after. Each paragraph is charged separately. Name and address must be counted. Series discounts, conditions, and special terms to regular trade advertisers will be quoted on application.

Postal Orders sent in payment for advertisements should be made payable to ILIFFE & SONS Ltd., and crossed & Co.

All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford.—A.J.S. Agents since 1912. Write us for your requirements [9777

A.J.S.—For the earliest possible deliveries of 1919 models, advance specifications and super service, try the A.J.S. Specialists, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0125

A.J.S. 6h.p. Combination, coachbuilt sidecar, hood, screen, motor cycle as new, sidecar repainted, hardly used, stored last two years, perfect in every detail; any trial or examination; £80, no offers.—Orton, 47, Hale Lane, Mill Hill, N.W.7. [1303

1914 2¾h.p. T.T. A.J.S., 2-speed, clutch, winning T.T. Race 1914 Junior by Eric Williams, re-enamelled and plating, overhauled by specialist, lamps, Klaxon, new chains, guaranteed as new, and very fast; £45.—Castadot, 1, South Western Rd., Twickenham. [1515

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9189

Auto-Wheels.

AUTO-WHEEL, splendid condition; £8.—Smith, 134, Hewitt Av., Noel Park, Wood Green. [1530

AUTO-WHEEL, good condition, original tyre; £6/10. —Carter, 82, Leghorn Rd., Harlesden, N.W.10. [X0979

AUTO-WHEELS, in good condition, £7, £8, £9, £10, the latter with shock absorber; accept £30 for four.—S. Harris, 22, Hatfield Rd., Stratford, E.15. [1563

MAUDES MOTOR MART

100, Great Portland Street, LONDON, W.1.

Telephone: Mayfair 552.
Telegrams: "Ahdicate, Wesdo."

NO "HOT AIR."

As one of the oldest-established firms in the motor cycle trade consistently advertising in this paper, we believe it to be unnecessary to make any statements as to our business methods. They are too well known to most readers, and have stood the test of the past twelve years, and will, we believe, stand the test of the coming difficult times.

WE can offer you earliest deliveries of:

A. J. S.
P. & M.
LEVIS
CLYNO
NORTON
DOUGLAS
MATCHLESS
ROYAL ENFIELD
HARLEY-DAVIDSON
NEW IMPERIAL
HENDERSON
TRIUMPH
MORGAN
ZENITH
ROVER
JAMES

SECOND-HANDS.

RUNABOUTS AND CARS.

SUNBEAM, 1912 5-seater, dynamo.
BABY PEUGEOT, 1914, de luxe body.
MORRIS-OXFORD, 1914, 10 h.p., Limousine.
MATHIS, 1914, 7 h.p., 3-seater clover-leaf.
MORGAN, 1916, 8 h.p., Grand Prix M.A.G.

SIDECAR COMBINATIONS.

HENDERSON, 1914-15, 2-speed, 4-cylinder.	£90
HARLEY-DAVIDSON, 1917, Swan Sidecar..	£128
HARLEY-DAVIDSON, 1917, 7-9 h.p., mag.	£128
SUNBEAM 1918 3½ h.p. Combination, all accessories...	—
ENFIELD, 1916, 8 h.p., 2-seater Sidecar ..	£82
HUMBER, 1917, 8 h.p., flat twin	£94
INDIAN, 1915, 7-9 h.p., just been overhauled	£68
A.J.S., 1916, 6 h.p. 3 speeds	£100
P. & M., 1914, 3½ h.p., wicker Sidecar, as new	£62
A.J.S. 1917 6 h.p. Combination, all on	—
MATCHLESS, 1916, 8 h.p., M.A.G., £40 worth of extras	—

SOLO MACHINES.

ENFIELD, 1912, 2¾ h.p., 2-speed, chain-drive	£20
DOUGLAS, 1914, 2¾ h.p., 2-speed, nice order	£36
DOUGLAS, 1914, 2¾ h.p., 2-speed, as new ..	—
LEVIS 1915 2½ h.p. Popular Model	£22
RUDGE, 3½ h.p., 1913, fixed gear, very fast	£20
NEW HUDSON, 1915, 2½ h.p., 2-stroke	£20
DOUGLAS, 1915, 2¾ h.p., 3-speed, and clutch	£52
REGAL, 1914, 2 speeds, all accessories ...	—
P. & M., 1914, 3½ h.p., 2 speeds, kick-starter	£48

Lists giving fuller particulars upon request.

100, Gt. Portland St. LONDON,——W.1.

MAUDES MOTOR MART
THE SEAL OF SATISFACTION

MOTOR CYCLES FOR SALE.

Auto-Wheels.

AUTO-WHEEL (De Luxe), and B.S.A. cycle, specially built combination, first-class condition, accessories, spares; £19, or nearest offer for immediate sale.—Allison, Cinema House, Maybole. [X1078

Bradbury.

BRADBURY Combination, £35, or seperate; Hercules C.B. sidecar, £8/5.—Parrott, 12, Paddenswick Rd., Hammersmith. [1543

Brown.

4h.p. Brown, fast and powerful, new sporty appearance; 26 gns., bargain.—11, Pretoria Av., Walthamstow, E.17. [1531

B.S.A.

B.S.A., 3-speed, 1919 models in stock.—Reys, 378, Euston Rd. [1308

1919 B.S.A.—Early deliveries at Briggs, Motor Agent, Wellingborough. [X0120

B.S.A.—New model H. chain drive in stock; immediate delivery.—Moss, Wem. [X1096

NEW B.S.A.'s in stock; immediate delivery Model K.—Alexander, Agent, Wallasey Village. [1506

1916 Model K. B.S.A., 3-speed, coachbuilt sidecar, fully equipped; offers.—Coffin, Holwell, Sherborne. [X1101

1919 B.S.A. Models, 78 gns. and 76 gns.; sidecar 28 gns.; immediate delivery.—Wallace Batchelor, Clarence St., Kingston. Tel.: 1809. [1463

NEW B.S.A. Combination in stock, 4¼h.p., chain-cum-belt, No. 2 B.S.A. sidecar; £109/4.—Elce and Co., 15-16, Bishopsgate Av., Cannomile St., E.C.3. [0492

B.S.A., 4¼h.p., 1917 Model K. and best sidecar, speedometer, lamps, etc., perfect condition, only done 100 miles; £100, or near offer.—Dixon, 30, St. Anne's Rd., Caversham, Reading. [X1104

B.S.A.—For the earliest possible delivery of 1919 models, advance specifications and prices, sole district agents, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0126

B.S.A. 4½h.p. All-chain Combination, Mills-Fulford sidecar, Pillion seat, speedometer, and lamps and accessories; £65; all in splendid condition.—J. G. Brown, 14, Alexander Av., Southall. [1547

B.S.A. 1916 Combination, chain-cum-belt, Mills-Fulford coachbuilt sidecar, splendidly equipped with Lucas accessories, Watford speedometer, done 1,000 miles only, the whole outfit indistinguishable from new; £75.—7, Mason's Av., Wealdstone, Middlesex. [1431

Calthorpe.

4-5h.p. Calthorpe Combination, 1916, Enfield gear, 3 lamps, wind screen; any trial given; offers.—Box 2,553, c/o *The Motor Cycle*. [X1041

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

Chater-Jap.

CHATER-J.A.P. 6h.p. Twin, automatic inlets, 2-speed, handle starting, Bosch, Binks, Druids, car tyres new, Millford caster wicker sidecar, now driven by invalid from sidecar, shabby appearance, but ready go anywhere; £17/10.—Captain Balchin, Kingsdown, Deal. [X1006

Clyno.

CROW Bros., High St., Guildford, West Surrey agents for the 1919 Clyno. Order now to ensure early delivery. [1553

CLYNO, 2 speeds, Empress underslung sidecar, S-6 h.p., good condition; 36 gns.—245, Hammersmith Rd., W.6. [1535

Dayton.

DAYTON 2-stroke Lightweight, splendid order throughout, lamps, etc.; £17/10.—Speechley, 1, Gunnersbury Lane, Acton, London. [1571

Douglas.

DOUGLAS Motors.—Earliest deliveries, all models. Book yours now.—Briggs, Motors, Wellingborough. [X0492

DOUGLAS.—Write us your requirements; either new machines or second-hand.—Moffat, Yeovil. Tel.: 50. [1103

DOUGLAS Motors.—Send your name for waiting list now to Gibb, Douglas Expert, Gloucester. 'Phone: 852. [4749

1916 (Dec.) Douglas, 2¾h.p., 3-speed, lamps, horn, complete outfit; 55 gns.—Box 2,556, c/o *The Motor Cycle*. [X1075

DOUGLAS, 2¾h.p., 1912-13, 2-speed, X'all saddle, perfect running order; £24/10.—Sgt. Fewcett, Aerodrome, Southport. [X1036

DOUGLAS, 2¾h.p., 1913, new tyres, belt, horn, lamp, good condition; £30.—Allsopp, Aberdour Villa, Dollar, Scotland. [X0978

MOTOR CYCLES FOR SALE.

Douglas.

BEST Deliveries of 1918 Douglas models, also spares, by the man on the spot, Eli Clark, the pioneer agent, wholesale and retail, Cheltenham Rd., Bristol. [0966

DOUGLAS, 1915, T.T., 2-speed, perfect order, 1". and H. lamps, 2 generators, speedometer, watch, horn, spares, re-enamelled.—Lieut. Bowden, Halefield Camp, Wendover. [1511

1914 3½h.p. Douglas and Coachbuilt Sidecar, kick start, 2-speed, clutch, fast, top-hole condition, new tyres, tubes, Klaxon, lamps, engine just overhauled; £50; no dealers; seen by appointment; any trial.—68, Burnt Ash Rd., Lee. [1578

NEW Douglas Motor Bicycles, 2¾h.p. and 4h.p. models. We are now in a position to accept orders for very early deliveries. No permits required. Full particulars and prices will be sent on application.—Robinson's Garage, Green St., Cambridge. [1566

DOUGLAS, 1913, 2¾h.p., 2-speed, Pull pan saddle speedometer and watch combination, dynamo lighting front and rear, brand new tyres and belt, foot boards with mudshields, condition perfect; £33; private owner.—Tomlinson, 42, High St., Marylebone. [1410

2¾h.p. Douglas, 2-speed, £30; 3½h.p. Triumph, sidecar, £22/10; W.O. Douglas, T.T., 2-speed, mileage 420, £50; 3-speed clutch Triumph, T.T., new tyres, lamps, £42; P. and M., 2-speed, £20; Triumph, 3½ h.p., £18; all good running order.—Wall, Aldenham Rd., Bushey. [X1065

Enfield.

ENFIELD, 1915, 3h.p., with new sporting £12 sidecar; £50.—G. Baets, 10, King's Rd., Richmond Surrey. [1518

1914 6h.p. Twin Enfield Combination, ready drive away; £60, no offers.—185, Brighton Rd., South Croydon. [X1018

1919 Enfields; combination 110 gns., 2-stroke 50 gns., 3h.p. twin 65 gns.; immediate delivery.—Wallace Batchelor, Clarence St., Kingston. Tel.: 1809 [1464

1914 Enfield Combination, 6h.p., perfect, stored since war; £55.—2, Ivy Villas, Oakleigh Rd., Whetstone, N.20. (Saturday 2.30; nearest station New Southgate. [1557

Excelsior.

7-9h.p. American Excelsior, perfect running order; £27/10.—54, Coval Rd., Mortlake, S.W. [X1025

1913 4¼h.p. American Excelsior and S.C., clutch, automatic carburetter, very powerful; expert trial and examination; £18.—7, Havelock St., York Rd., King's Cross, N. [1538

F.N.

F.N., 2¼h.p., shaft drive, 2-speed, clutch, mechanically sound; £15.—Rolls and Co., Ltd., Upper Edmonton, near Silver St. Station. [1548

Harley-Davidson.

1915 7-9h.p. Harley-Davidson Cancelet Combination excellent condition; 70 gns.—Walker, Whalley Bank, Blackburn. [1493

HARLEY-DAVIDSON, 1915, 7-9h.p. electric model, has just been overhauled by Harley expert; price £80.—Apply, Meeks, Dalling Rd., Hammersmith, W.6. [1519

HARLEY-DAVIDSON Combination, late 1915, electric light, dynamo, speedometer, etc., light car tyres, been very little used, unscratched, very smart, and as new; any trial; 80 gns.—Whittall, 79, Annesley Rd., Collingdale Av., Hendon. [1304

1917 Model F. Harley-Davidson, solo, engine No. 17T 4561, T.T. bars (£93); largest Lucas head lamp and generator (£3/15); Lucas rear and generator (15/6); Jones 80 m.p.h. speedometer with maximum hand and trip (£6/6); Stewart mechanical horn (£1/5); disc wheels (£2/2); extra Harley toolbox on tank (15/-); Duco watch (13/6); spare sprocket, valve springs, chain links, and sparking plugs (£1/10). Figures in brackets refer to cost prices, the total of which is £110/2. Purchased in August, 1917, and used one month, total mileage 260; could be sold as brand new; £95, no offers.—75, Palatine Rd., Withington, Manchester. [X1048

Henderson.

HENDERSON, 10h.p., 4-cyl., coachbuilt sidecar, splendid condition, long wheelbase, tyres excellent, Palmer cord and Dunlop heavy; £58.—Longfield, Longfield Rd., Rodwell, Weymouth. [1487

Humber.

HUMBER Brand New 3½h.p. Horizontal Twin model in stock.—Moss, Wem. [X1097

HUMBER Twin, 2¾h.p.; £20, or exchange with cash for cycle car.—39, Bulwer Rd., Leytonstone. [X0407

HUMBER, 1914, 3½h.p., S.A. 3-speed, accessories, little used; £32.—Mylam, 197, London Rd., W. Croydon. 'Phone: 2379. [1477

HUMBER 6h.p. Flat Twin, water-cooled, and Gloria sidecar, 700×80 tyres, electric lighting, perfect condition; £80.—Smith, Dene Hall, Bishop Auckland. [X0723

3½h.p. Humber, with Grado variable gear, Bosch mag., kick start, running footboards, complete with coachbuilt sidecar, in perfect condition, newly upholstered and overhauled; for disposal owing to death of owner; may be seen at 1, Turner St., Ramsgate; price 50 gns. [1554

TYRE BARGAINS

ELITE RUBBER CO. LTD.

We hope in the near future to resume our usual service to the many motoring friends, new and old, after so long a time spent in the Service of the Country on important Munition Work. As in the past, it will be our constant thought to supply the requirements of our customers.

We have the following **SPECIAL CLEARANCE LINES** in **MOTOR CYCLE COVERS, BELTS, TUBES,** etc. These goods are quite new. Any article sent on 7 days' approval against remittance. A 3/- outfit sent free of charge to all purchasers of Covers and Tubes, as advertised, on orders exceeding £1.

Bates No. 1 Special Heavy, 26×2¼, **30/-**, list 58/-; 26×2⅜, oversize for 2¼ rims, **35/-**, list 61/6.

Kempshall Heavy Non-skid. 26×2½, **45/-**, list 72/6. A few only.

Special Offer.—Diamond Rubber-studded Extra Heavy **Covers** best make, fully guaranteed, 26×2, **28/6**; 26×2¼ for 2¼ rims, **49/6**; 26×2½ for 2½ rims, **40/6**; 650×65, **45/-**. List price almost double.

Extra Heavy Rubber-studded **Covers,** 28×3, **50/-**, list 69/6, fully guaranteed; 28×2½ **Hutchinson** T.T., **30/-**, list 48/-, suitable for Indians, etc.

Bates Inner Tubes.—26×2, **6/-**; 26×2¼, **6/6**; 26×2⅜, **7/6**; 26×2½, **8/-**; 28×3, **10/6**; 26×3, **9/-**. Butted **1/6** extra.

Best quality **Belts** (cannot advertise name), 6ft. lengths by 1in., **7/6** each; 6ft. 6in.×⅞in., **6/9** each.

Pedley Belts, any length, ⅞in. section, **1/7** per foot; ⅞in., **1/9**; 1¼in., **2/6.**

Retreading: Extra Heavy, **17/6**; Heavy **15/-**; Medium, **12/6.** Time required 7 days.

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MOTOR CYCLES FOR SALE.

Indian.

7h.p. Indian, 1913, good condition, running order; £50.—Wright, 191, Greenstead Rd., Colchester. [X0433

1915 7-9h.p. Indian (Canadian), thoroughly overhauled; £43; appointment.—53, Brownhill Rd., Catford. [1584

INDIAN, 1913-14, 7-9h.p., racing model, clutch, lamps, splendid condition; £36/10.—17, Goldhawk Rd., Shepherd's Bush. [1583

INDIAN, 7-9h.p., T.T. clutch, 1915, exceptional fast, as new; £50, no offers.—Write, Lt. G. Vandervell, 103, Cambridge Gardens, W.10. [14

7-9h.p. 1914 Indian, Swan sidecar, electric lighting set, accumulators, tools, several spares; £50.—Mettam, The Mount, Staveley, near Chesterfield. [X1065

1915 Indian, 7-9h.p., free engine, clutch, hand operated, perfect running order, good condition; seen by appointment; £55.—Gower House, Burges Rd., Thorpe Bay, Essex. [X0885

1914 4h.p. Single Indian, with Millford coachbuilt sidecar, electric lamps and horn, less accumulators; £40, or near offer.—Hughes and Martin, Tommyfield, Oldham. [1537

7-9h.p. 1913 Indian (red), disc wheels, T.T. bars, clutch, Lucas lamps, recently done up, all in perfect condition; 40 gns.—H. Hopkinson, 62, Sloane St., London, S.W.1. [1592

7-9h.p. Indian Motor Cycle, sidecar, 1915, for sale, a bargain, 3 speeds, full set lamps, electric and acetylene, first rate condition.—Apply, 67, George St., Portman Sq., London, W.1. [1066

INDIAN 7-9h.p. Combination, 1914, perfect condition, electric starting and lighting, lever controls, speedometer, all tyres new, enamelled grey, only done a few miles; £90; Kent.—Box L8,190, c/o *The Motor Cycle*. [1522

1915 Model C. Indian Motor Cycle, 7-9h.p., and Mills-Fulford tandem sidecar, 3-speed gear, spring frame, and electrical equipment, all in excellent condition; price £85.—Apply, Pettit, 28, Station Rd., Bexhill. [1545

James

JAMES 4¼h.p. Combination, bought 1915, all accessories, good condition; £58.—To be seen by appointment at Woodhouse's Garage, Tram Terminus, King's Norton. Tel.: 169. [1597

Lea-Francis.

LEA-FRANCIS, 1914-15, 2 speeds, clutch, kick start, enclosed chains, lamps, condition as new; £55; appointment.—35, Southerton Rd., Hammersmith. [1556

Levis.

LEVIS, new Model E., chain driven, 2-speed, in stock.—Moss, Wem. [X1096

LEVIS, engine and carburetter new, machine, tyres perfect; £28.—Alexander, Wallasey Village. [1507

1915 Levis Popular, perfect condition, little used, fully equipped, new back tyre; £21.—Wood, Mynyddissa, Mold. [X1103

LEVIS.—For the earliest possible delivery of 1919 models, advance specifications of all models, sole district agents, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0127

Matchless

MATCHLESS, 8h.p., sidecar, accessories, spares, splendid condition; bargain, £45.—Pritchard, Druid, Corwen. [X0976

CROW Bros., High St., Guildford, West Surrey agents for the 1919 Matchless. Order now to ensure early delivery. [1552

NEW Victory Model Matchless in stock, with spare wheel; £140.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

MATCHLESS Combination, 6h.p. J.A.P., elaborately equipped; expert examination or trial; £45.—9, High St., Biddulph, Staffs. [X0982

1918 Matchless Combination, complete, spare wheel, screen, Lucas accessories, run 10 miles only; £135, cost £150.—Short, 485, Upper Richmond Rd., East Sheen. [1406

MATCHLESS War Model Combination actually in stock, with spare wheel and tyre; £140; seen by appointment.—J. Tassell, 1a, Bloomfield Rd., Plumstead, S.E.18. [1606

MATCHLESS.—Special contracting agents for post-war Matchless models; earliest deliveries; exchanges and easy payments arranged.—Maudes', 100, Gt. Portland St., London, W.1. [9920

1914 8h.p. Matchless Combination, M.A.G. engine, Bosch mag., Swan sidecar, with hood and screen, electric lighting, new spare outer cover and inner tubes, tools, and accessories; £75.—Apply after 7 p.m., 55, Earlham Grove, Forest Gate. [1509

Nestor.

FOR Sale, Nestor T.T., Precision engine, 3½h.p., 1914, new belt and cover (Dunlop), just been rebushed, perfect running order; £25, or near offer.—E. Poles, Wylds, Bristol Rd., Bridgwater. [1562

New Hudson.

NEW Hudson Combination, 1914, 6h.p., 3-speed, speedometer, and all accessories; £60.—Mylam, 197, London Rd., Croydon. 'Phone: 2379. [1479

THE MOTOR CYCLE
ESTABLISHED IN 1903
AND FOR OVER SIX YEARS THE ONLY PAPER SOLELY DEVOTED TO THE PASTIME

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Restrictions on Export Trade.

WE are strongly of opinion that the time has come when all restrictions on the export of motor cycles and the parts thereof should be removed with all possible despatch. It is very desirable that the restrictions referring to home trade and manufacture should also be relegated to the past without delay, and doubtless such will be the case. Of course, we know that a certain shortage of material exists in many directions, and that it is inevitable that many riders and would-be riders must possess their souls in patience for a time. This, we suppose, cannot be helped; but there are other things which can be helped, and the consideration of the authorities must at once be given to these if British trade abroad is not to suffer.

These points force themselves upon our attention for the following reasons: A motor car and motor cycle exhibition is to be held at the Belles Artes in Barcelona early next March. This is being organised under the auspices of the local trade protection society, The Camara Sindical de Automovilismo de Barcelona, and we are informed by a correspondent in Spain, who is one of the members of the Committee of Propaganda which has been formed in connection with this exhibition, and the representative of many British manufacturers, that there will apparently be difficulty in getting goods from Great Britain—not because the goods are unobtainable, but because of the difficulty in getting the necessary "permits" to enable them to export the goods before it is too late.

The export trade is of paramount importance at the present time. We have of necessity been obliged to relinquish our markets in many foreign countries, as well as in our own Colonies and Dominions, to our friends across the Atlantic, and every effort that can possibly be made to regain this lost trade and establish new markets must be made—and made at once. The Americans, our correspondent tells us, are sending to this exhibition everything that is asked of them, and the American goods compete directly with the British. In any case we have keen competition which will be carried on by the most up-to-date methods to face; but to face this at once with an excellent prospect of success will be child's play to the task of regaining lost markets and re-establishing British trade supremacy where the Americans have once gained a footing.

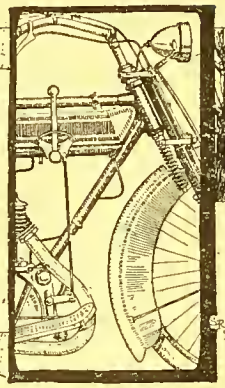
Although we are apt to pride ourselves upon the superiority of British goods—and here we have certainly good excuse for legitimate pride—it cannot be denied that the Americans are doughty rivals, their goods are excellent, and their business methods and arrangements for the prompt supply of spare parts second to none. The British maker has much to learn from them, and already much leeway to make good, and it would be a thousand pities if he should be hindered in his efforts by red tape. Surely goods might be released for the Overseas trade without any further delay and without worrying restrictions, or, if that be impossible for the moment, then surely the permits should be granted without the wearying circumlocution so dear to the official mind. If, as we are informed, a number of British makers actually have the goods in stock, why should there be any difficulty placed in the way of immediate export through lethargy on the part of the Government?

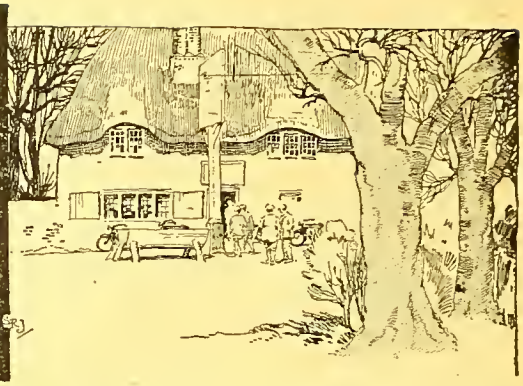
We have for years been urging the British motor cycle manufacturer to look beyond the home market to the immense field which could be found for his products in other lands, and to look forward to the time when his output would be so large that it could not be consumed in this country alone. Now, apparently, it becomes our duty to urge upon the Government the desirability of removing all control from the export trade at the earliest possible moment, and to assist rather than hinder the British manufacturer in regaining and retaining his proper share of the Overseas markets.

An index to the advertisements in this issue will be found on the page facing the back cover

Notes on Flat Twin Engines.

Limiting Factors in the Development of the High-power Twin.





AT the time when the flat twin is being hailed as the power unit of the future, it would be well to remind ourselves of the obvious weaknesses and disadvantages which exist in present engines of this type, and which must be eliminated before its universal adoption becomes possible.

It is unfortunate that up to the present the evolution of the type has practically been in the hands of one firm alone, and consequently any criticism or mention of a specific defect is promptly construed by that firm's very well satisfied clients as a direct attack on a generally well-conceived machine; this apparent monopoly, however, proves at once that the difficulties in the design and manufacture of a horizontally-opposed unit are greater than the lay mind would imagine, or otherwise more manufacturers would have come along sooner for a share of what must have been a very lucrative market.

It is curious also that, whilst the specialist firm has founded its success upon the lightweight engine, the experiments of the manufacturers have been almost entirely with larger units, and their lack of finality in design and commercial success has been a noticeable feature of the latter years of motor cycling history.

Frame Design.

The most obvious defect of the unit, especially in its larger sizes, is its unwieldiness and consequent unadaptability to the frame of a motor cycle; even in the smaller edition frame breakages are all too frequent, simply because the engine forces a certain construction upon the frame designer. Essentially straight tubes are contorted to avoid that obtrusive front cylinder; heavy lugs are then required to brace things up again; and, whenever you have a light tube entering an abnormally heavy and rigid lug, you have the latent possibility of fracture.

The frame problem becomes increasingly difficult as the power and size of the engine increase; and the "duplex" frame, whilst permitting a more scientific design, may become so cumbersome as to strike terror into the heart of the prospective rider as he views its size and apparent weight. These defects notwithstanding, I think that for very large flat twins the duplex frame (on Scott lines, for example) is the only possible solution: and since cheapness of construction cannot be considered a strong point of any flat twin, the extra expense of duplex frame construction will not be exceptionally disadvantageous.

Considering the engine itself, we find ourselves faced with some very serious problems. Perhaps the greatest defect in existing units is weakness in the crankshaft, which is further intensified by cranking or otherwise setting the connecting rods out of the centre line of the cylinders. Here again we have the type of engine forcing the designer to a faulty construction, since if the crankshaft was supported in a centre bearing, and the cylinders were staggered enough to use straight rods with a central thrust, the engine would be as unwieldy in width as it is in length.

It remains to be seen if our designers can give us a crankshaft to stand the explosions of large cylinders and yet keep the crank case width within reasonable limits.

Economy.

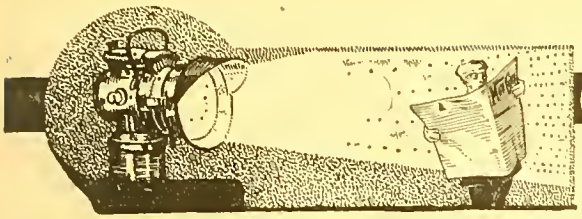
Large flat twins almost demand water-cooling in order to secure cool running of the back cylinder, concealed as it is by crank case, magneto, silencer, etc., and thus the advantage in weight of the outside flywheel over inside is more than lost by the weight of the cooling arrangements. Also the outside flywheel is not a monopoly of this type of engine.

Many of these points are matters of adjustment and road experience; others are problems of extreme difficulty, and will tax the ablest of designers and the most highly organised manufacturing plant; whilst others, again, are merely matters of taste or depth of purse. Such as they are, however, and each appealing to each, they serve to show that this fascinating type of engine has far to go before it reaches finality.

D. H. SMITH
(M.T., A.S.C.)

IN THE HEART OF ENGLAND

A Hobart outfit in the county of thatched and timbered cottages—Warwickshire.



Occasional Comments

"By Ixion"

Improving Motor Cycle Lubrication.

I NOTICE that many inventors appear to consider that motor cycling lubrication problems are solved when a mechanical pump is fitted, and that a positive halo surrounds the machine if the pump automatically accommodates itself to varying engine loads. I differ *in toto*. In the first place, I do not want to be bothered with any hand-operated device whatsoever: neither a car nor an aeroplane afflicts its driver in that way. In the second place, I want reduced oil consumption; why should one motor cycle engine require a pump every five or eight miles on top gear whilst another of the same h.p. will do twenty miles on a charge? In the third place, I want minimum carbonisation, which is impossible so long as overstressed crankshaft and connecting rod bearings are oil-cooled (one of the reasons why the drip sight feed has lost ground is that it fails to slosh cold oil over the hot bearings, as a hand pump does). A mechanical oil pump does not necessarily affect the two latter points, though it may reduce carbonisation by preventing an excessive supply under light loads.

Some Suggestions.

IN aircraft engines a low oil consumption is vital, partly because it is useless to pare 50 lb. off the weight of an engine if you carry an equal weight of oil, which might have been unnecessary with a better lubrication system. Low oil consumption is attained on aircraft by attention to several obvious points. (*a*) Oil leaks cause an engine to be turned down on its acceptance tests (but some motor cycle engines are caked with oil externally after a short run). (*b*) The oil temperature is not permitted to exceed a reasonable limit; in nearly every case the oil is pumped through the engine at high speed, and then passes through some form of cooler. (A roughly similar system was adopted with excellent results on the pre-war W.D. motor cycle.) (*c*) Oil is prevented from reaching the cylinder in excessive quantities, where it is largely burnt up without doing much useful work (but in many pre-war machine engines lashings of oil were required in the cylinder to keep the temperature below a limit at which distortion began to have disastrous effects in the running.)

The Question of Expense.

IN all these matters the manufacturer is, of course, hampered by questions of cost. A dry sump and an oil-cooler may prove more expensive than a hand pump and a crank case. Drilled crankshafts are more costly than the solid type. If he keeps excess of oil out of the cylinder, the gudgeon pin bush may complain. Ball and roller bearings for the crankshaft and big end are hedged round with patents, and are more expensive than phosphor bronze bushes. It may be dearer to use a machined steel cylinder and an alloy piston than the old cast iron types. Still one or two firms do all these things, make money, and list their wares at conventional prices. In other words, the practicable ideal at the present moment is a machine which:

(*a*.) Gives its rider no work to do with regard to oiling.

(*b*.) Registers a far greater oil economy than the 1914 standard.

(*c*.) Has a long bearing life without oil cooling.

(*d*.) Carbonises comparatively slowly.

(*e*.) Costs no more than conventional types.

The Main Need.

TO judge by the patent lists, by confidential information and by rumour, the motor cycle industry is on the road to free itself from the accusation of mistaking "oil-cooling" for "air-cooling," under which we have deservedly laboured for so long. Two details, however, demand more attention than they have yet received. Oil is still sloshed in huge quantities up into the cylinder, because old-time cylinders and pistons otherwise "went out of round." The new thick-headed aluminium pistons will keep cooler. The "slipper" pistons will suffer less from oil friction. The new steel cylinders, machined inside and out, will remain true when they are at their hottest. Carbonisation and consumption will be "cut," provided loose oil is fended away from the cylinder mouth; but scraper rings must not be used recklessly for this purpose, or their friction will be a nuisance. Then, when the oil supply to the cylinder is reduced to rational proportions, our tiny gudgeon pin bushes will be overheated and overloaded, unless they are redesigned in the meantime. All these points are far more important than the actual oil pump. There is no reason why a 3½ h.p. motor cycle engine should not do its 1,000 m.p.g. of oil without giving the rider any more trouble than the occasional replenishment of its tank. No firm can satisfy my demands in respect of lubrication simply by sticking a new pump or drip feed on to the old type of engine.

Jacketed Carburetters.

THE ordinary pocket lighter provides ample evidence that engines are not going to be any easier to start on the juice now marketed. This problem will be more acute in respect of multi-cylinders with long induction pipes. The stub inlet pipe of the average single warms up the carburetter very rapidly by conduction from the cylinder head, but a V, a four, or a flat twin can be a great nuisance with No. 3 spirit on a cold morning. I do not know whether we shall get better petrol presently, or whether we may ultimately be driven to adopt heating devices at starting. I should not be surprised if we live to see a demand for water jacketed carburetters, with filler holes and drain taps to the jackets. With a teacupful of boiling water an instant start would be assured. In the absence of such a simple auxiliary, machines with long induction pipes are becoming very tiresome.

The Lessons of Munition Production and the Overseas Motor Cycle.

British Machines. We do not agree with a correspondent whose letter recently appeared under this heading to the effect that manufacturers have profited nothing by the war as far as Overseas requirements are concerned. Nothing could be farther from the actual facts. True, that the necessity for standardisation in military machines has rendered revision of design impossible, but nevertheless every manufacturer of intelligence has gone ahead with leaps and bounds during the last four years. Taking the actual design of machines, weaknesses once undreamt of have been detected and overcome, and whereas, with one make of military motor cycle we could quote, frame breakages either of a serious or petty nature were perpetual, this machine has to-day been so reinforced and strengthened that the original breakages, which caused so much annoyance, now seldom occur.

Again, what about the development of special Overseas models that have been made in Great Britain for the various Allied forces—machines which tally exactly with the specifications laid down for years by our Overseas readers, yet ignored, it is regrettable to say, by our manufacturers till the necessities of war forced them into practice? Quite a number of these machines will be the "standard" models for the 1919 "home" trade.

A pretty scene on the Victoria Road, Capetown.

But over and above all this, and quite apart from the actual designing of motor cycles, engineering as a whole has made vast strides since 1914, and the improvements that have taken place in machinery and so on must inevitably reflect favourably upon the motor cycle industry. Many of the firms who, at the outbreak of war, were laboriously manufacturing motor cycles by sleepy and old-world methods, have since been plunged into the seething cauldron of munitions. They have been compelled to undertake machining of the finest kind with the most modern of machinery and up-to-date methods, and the return of peace will find them infinitely better equipped, both in the matter of intelligence and machinery, than they were before the war. All this must contribute to the improvement of motor cycles and the ultimate reduction of their cost, which will benefit the Overseas buyer.

There is yet another aspect of the case. Most motor cycle engineers who have been compelled to take up engineering of another kind during this period of stress have, nevertheless, concentrated their—leisure energies on their old favourite line of employment. It may truly be said that "once a motor cycling engineer always a motor cycling engineer," and we know of numbers who have stuck to this line of engineering in the face of more promising employment, simply because all their interests were centred there. Most of these men, while their factories have been employed on other work have been quietly working on their post-war designs in their leisure hours, correcting, revising, and checking each detail with minute care, so that they have on the drawing boards designs for Overseas models which will be carried into effect immediately conditions permit, and in which the designers feel confident of success, thanks to the care and minute work that have been expended upon them.

Reliability. Probably most experienced riders are of the opinion of one of our leading contributors when he says that, in spite of the fact that he is a flat twin enthusiast, he would select a single cylinder in preference to a flat twin if to-morrow he were confronted with the task of going through a strenuous reliability trial on journalistic work. Though delightful to drive and handle, the flat twin is not the type of engine which flourishes under hardship. As regards hard work, there is the same difference between the big single-cylinder mount and the popular type of flat twin as there is between the finely

Overseas Section.—

tuned touring car and the light lorry. The former is designed in contemplation of its receiving a certain amount of skilled attention and moderately considerate handling, the latter is designed for heavy day and night work with a minimum of attention—*i.e.*, the primary consideration in designing the commercial vehicle is reliability.

The same may be said for motor cycles. For many years absolute reliability was the chief aim and object of motor cycle manufacturers, and the single-cylinder machine was the outcome. It left nothing to be desired as regards reliability, and, so much realised, riders began to ask for more. They demanded vibrationless engines of even torque, and as a result the flat twin—naturally, perhaps—presented itself, and appealed strongly to that class of rider whose sole demand is not merely for reliability, but for a reasonable degree of reliability coupled with delightful motion and something specially attractive in the way of engine revs. He is willing to give that attention which the single does not need in return for these advantages—in fact, he expects it, just as the owner of a sporting car expects his vehicle to require more attention than a commercial lorry.

We do not mean to infer from this that the speedy flat twin motor cycle necessarily requires considerable attention. To maintain it in concert tune certainly requires work, but if one is content with mediocre running little attention need be given, and we have ourselves possessed flat twins which ran admirably throughout periods of neglect. But at the same time it must be admitted that if both types are to be kept in constantly good tune the flat twin requires more attention than the single, as it is a less sturdy type of engine. All things considered, the acme of motor cycle reliability is probably realised in the 3½-4 h.p. single-cylinder chain drive machine, and, unlike the twin-cylinder of the same power, the single will stand overloading in the way of sidecar attachment—a course which is quite out of the question in the case of the flat twin thoroughbred.

New Hudson outfits in South Africa. The scene is at Pulpit Rock, Bain's Kloof, sixty-five miles from Capetown.

♔ ♔ ♔

Sidecar Chassis Design.

THE sidecar is an unmechanical vehicle, and time and again it has been proved that correct engineering principles cannot always be successfully applied. We have known engineers who have set out to design a chassis on correct mechanical lines, the whole outlay appearing excellent on paper, but when put into practice it was discovered to possess numerous weaknesses. Curved tubes offend the eye of the engineer, but we are yet to be convinced that the straight tube principle is the best to employ in sidecar chassis design. It is true that the Scott sidecar, which is a straight tube chassis, has stood the test of time, and leaves little to be desired, but since its use is practically limited to Scott machines, which are low-powered as sidecar machines go, and which also possess engines of very even torque, the success of this individual design is no criterion that it could be as successfully applied in every case. What tests the strength, or rather the efficiency, of sidecar design more than anything is the rapid acceleration of a powerful engine, and we have ourselves possessed specially tuned mounts calculated to find in a few days sidecar weaknesses which the ordinary tame touring mount might have taken a year's steady riding to develop.

The objection to the straight tube chassis is that it is inevitably rigid, and absolute rigidity in a sidecar is not desirable. If the whole structure were one unit it would be a different matter, but in the sidecar outfit we have two distinct frame structures, the one horizontal and the other vertical. Therefore, a certain amount of yield between the two is necessary in order to take up or rather permit a small degree of differential movement, each being a rigid structure in itself, and therefore apt to succumb to the intermediate stresses unless this provision be made.

We have more than one example in the trade, and individual riders can recount similar experiences, where attempts to stiffen up and strengthen sidecar connections have at once led to frame breakage. Strength in sidecar chassis is in no way dependent on masses of material, and what is ordinarily known as strength of construction may prove to be weakness when applied in practice. We recall the efforts of one competition rider to stiffen up his connections because the amount of yield they permitted suggested weakness; he added supplementary straight tubes between various points of the motor cycle and sidecar frame, and on his very first ride out broke both frames at the straight tube junctions. One can, indeed, go on "stiffening up" till something is bound to go, the weakest point always being adjacent to the strongest, and it may be added that a rigid sidecar is far less comfortable to ride than one which has a certain amount of give in it. For these reasons sidecars for the Overseas trade must receive very close attention at the hands of their designers.

THE NEW BROUGH MODEL.

A New Flat Twin from which Great Things are Expected.

IN our issue of November 21st we roughly outlined the post-war policy of Messrs. W. E. Brough and Co. as a decision to concentrate on a 3½ h.p. flat twin, and we are now able to give general particulars of this decidedly interesting product of the progressive Nottingham firm.

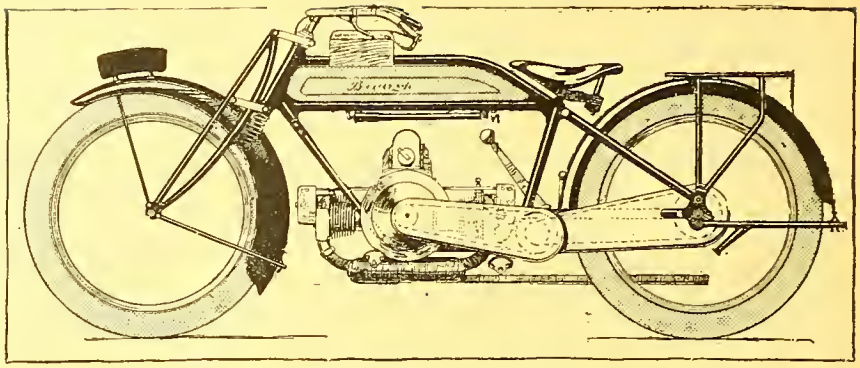
The engine of the immediate Peace model, though possessing many novel features, embodies no truly heterodox or revolutionary ideas. As we mentioned in June last, it shows remarkable efficiency on the bench, developing 14 b.h.p. at 4,200 r.p.m., which, it must be admitted, is remarkably good for a 489 c.c. engine. The maximum speed attainable is 5,600 r.p.m., and, lest this statement should cause a certain amount of incredulity, we may say that Mr. George Brough is prepared to stand by it to the extent of £100.

A feature of the engine will be detachable cylinder heads, which are secured by three bolts only, and incorporate the valve seats. The valves, which are of ample size, have no cages, and work directly in the casting and are parallel to the centre line of the cylinder, thus obviating the necessity for inclining the tappet rods. The rods themselves embody some interesting details as regards the ball joints, the adjustment, and the bearing on the cams, so that wear and noise are reduced to a minimum, and the rocker mechanisms are enclosed in neat aluminium cases. Special attention has been paid to the metallurgical side of the design, and the valves are guaranteed unbreakable.

A very neat, simple, and foolproof exhaust lifter and decompressing device has been incorporated, which operates inside the crank case casting.

Aluminium Pistons.

The pistons are of aluminium with strengthening ribs, the skirts being cut away to clear the cranks. The lower of the three rings fitted acts as a scraper ring, and at the same time secures the gudgeon pin. The connecting rods are light, but exceedingly stiff, and are of interesting and unusual design, as the big end, which is the subject of several master patents, successfully embodies a wide roller bearing. There are no loose pieces such as roller retaining rings and screws, and the whole is a very substantial yet light piece of work. The two-throw crankshaft is made in one piece from special steel, and the crank pins embody the inner roller race. The crank pins and main journals are drilled out for heat-treating purposes, which incidentally serves to lighten the unit. No balance weights are fitted, but the crankshaft as a whole struck us as being very neat and strong, and a sound engineering job.



The new 3½ h.p. flat twin Brough.

The main journals are on roller bearings, and there are two ball bearing camshafts, instead of one as on previous models.

The Crank Case.

Each cylinder is secured to the substantial crank case casting by three accessible studs. The top of the crank case forms a base for the magneto, which has an instantaneously adjustable coupling, so that any alteration in the timing can be effected by merely loosening two nuts and sliding the magneto back out of engagement. The timing gear cover, and, indeed, the whole of the crank case, is devoid of any ledge or abrupt dirt-retaining bends, and presents an easily cleaned surface. A sump having radiating fins is arranged in the lower half of the crank case to retain the oil for splash lubrication, and, by a special arrangement of dippers, the cylinders are equally served as regards the quantity of oil. The oil level is maintained by the usual drip feed lubricator and hand pump on the tank.

The aluminium induction pipes are worthy of special note, embodying as they do a principle well tried in connection with aero engines. The pipe is outside the crank case, from which and the cylinders it obtains its heat; and it is in order to allow for the expansion caused by this heating that special gas-tight sliding joints are provided, thus obviating any side thrust on the cylinder head, which would be liable to cause warping of the cylinder, or, at any rate, set up undesirable stresses. The exhaust pipes are taken in sweeping curves to a large welded steel silencer with a long rearward extension pipe. There is practically no back pressure of the gases set up by this construction.

It will be seen from the drawing that it has been possible to keep the overall dimensions of the engine within a reasonable limit, owing to there being no deep valve cage pockets, the recessing of the piston skirt, etc., all incidentally tending to reduce the weight. Various little sources of noise have been dealt with, including the flywheel, rendering the engine remarkably silent in operation.

The Gear Box.

A three-speed gear box with a long change speed lever is fitted and a well-designed kick starter is incorporated. The drive throughout is by chain, enclosed in neat and quickly detachable cases.

The interest, however, does not terminate with the engine. The frame, too, embodies quite a number of points which are the result of practical experience and show attention to detail. The engine is secured by four substantial bolts to the duplex tubular cradle, and this in turn can be detached by the removal of four bolts, which hold it up to a special coupling.

Special heavy lugs are used throughout, and the only bent tube is the top tube, which terminates in a graceful sweep into the main back stay. The back stays are not bent, as is usual, but the seat-pillar lug has two wide bosses which take the stays and allow them to straddle the rear wheel guard.

Interchangeability.

Messrs. Brough do not feel satisfied that any reliable spring frame has yet been invented, and they are therefore continuing to pin their faith to the rigid frame.

The handle-bars will also have special lugs welded on them for the usual accessories and attachments, and the tool bags are to be abolished and a neat sheet steel box fitted on the forward end of the tank above the top tube. The forks are special Druids with steel bushes at all pivoting points. The tyres are 28in. × 3in. and the wheelbase just 60in. Special aluminium caps are fitted over the bearing cones of the front wheel, which effectively prevent the ingres of mud and water.

Later on electric lighting will be provided as a standard, when Messrs. Lucas are able to provide the special dynamo lighting sets, and provision has been made for the attachment of the dynamo alongside the existing magneto.

The makers of this interesting machine have not been slow to absorb the lessons of the war, and great stress is laid on the policy of standardisation which will enable them not only to turn out a large number of machines but to keep down the price. Special attention has been given to the interchangeability of all parts, and this has been secured to a high degree without the sacrifice of efficiency.

The machine, as a whole, is designed expressly for the solo rider, and, in our opinion, is an excellent medium-powered mount for the purpose.

We heard a well-known rider bitterly condemning manufacturers for not making more experiments with 90° V twin engines with outside flywheels. In sidecar work he asserted there was nothing to equal them. He was anxious to know if we had heard whether any maker was likely to market such an engine.

ARIEL

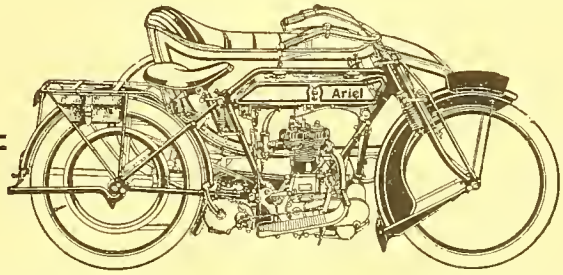
MOTOR CYCLES
Manufacture Resumed

Orders for Ariel Motor Cycles are now being accepted for home and export delivery.

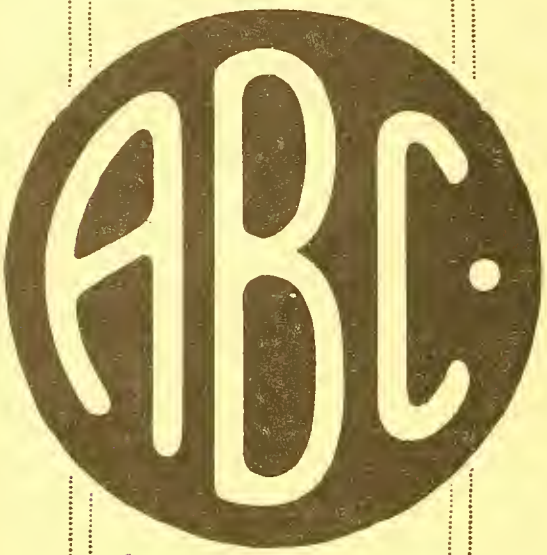
Being gradually released from our Government contracts we hope to give early delivery of Ariel 3½ h.p. single-cylinder models.

The Ariel Catalogue may be had upon enquiry.

ARIEL WORKS Ltd., 3, BOURNBROOK, BIRMINGHAM



In answering this advertisement it is desirable to mention "The Motor Cycle."



"The World's Best Motor Cycle."

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H.A.Co.

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Current Chat

Times to Light Lamps.

GREENWICH TIME.

Dec. 26th	... ...	4.24 p.m.
,, 28th	... ...	4.25 ,,
,, 30th	... ...	4.27 ,,
Jan. 1st	... ...	4.29 ,,

The Future.

Single, flat, or V twin? The result of the "Which type" referendum will be given in next week's issue.

The Sopwith Motor Cycle.

Our contemporary, *The Auto*, in "describing" the Sopwith motor cycle in upwards of a thousand words, omits to mention the A.B.C., the type of engine, and the type of gear.

Points for Designers.

Among the several things requiring the attention of the motor cycle designer may be mentioned improvements in suspension, mudguarding, chain cases, and carburetters.

In Ten Years' Time.

A prophet 'phones us to wish us a merry Christmas, and to prophesy that in ten years' time the electric combined lighting, starting, and ignition unit will be standard on all motor cycles. We shall see.

The Motor Cycling Club's Activities.

The Motor Cycling Club intends to have a pretty full programme in 1919. With this end in view it has decided that a paid secretary should be appointed. It will be a part-time job, and any enthusiastic motor cyclist who could take on the job is requested to apply to the chairman, Mr. Robert Head, 17, Baker Street, London, W.1.

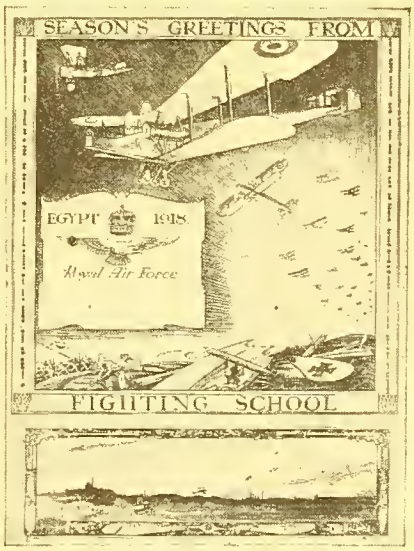
Next season's programme will contain a despatch riders' trial, the opening run, and the annual London-Edinburgh run, but further news of the club's activities will be given at its annual general meeting, which will take place on January 29th, 1919.

J.A.P. Twins.

The 1919 6 h.p. and 8 h.p. J.A.P. twin engines will be made with interchangeable crank cases, in order that they may fit motor cycles having identical frames without alteration.

1920 Models.

It is difficult for some designers to hide their enthusiasm for 1920 models (hidden away from the pressman's view) while they are detailing the additions designated "improvements" to the 1914 model which will be sold in 1919.



A greeting card received from Egypt. The inscription on the back reads as follows: "To the Editor of the 'Blue Un,' with Chief Mech. W. E. Humphreys's (late of Carden Monocars) compliments, hoping that next year will see us all back again and the good old times renewed. Cheerio! P.S.—It's hotter here than any monocar cylinder ever gets."

Special Features.

OVERSEAS NOTES.
A LIGHTWEIGHT NOT A TOY.
BENZOLE MANUFACTURERS.

Hush Models.

A flat twin lightweight from a Midland firm, a four-cylinder machine from a well-known light car company, and several new spring frame models.

Two-stroke or Four-stroke?

The two-stroke engine has not yet come into its own. One of these days some genius will design a two-stroke engine as economical as the four-stroke of the *same power* which will cost less to produce.

Runabouts and Sidecars.

The advent of the runabout type of vehicle is due entirely to the lack of adequate mudguarding on the average sidecar outfit. The de luxe sidecar combinations of 1919 will have several runabout rivals competing with them for the favour of buyers with £120 to £150 to spend. The Premier, A.B.C., A.C. Bantam, and another (also by a well-known light car company) are already well on the way. The moral to sidecar makers is clear: prices must be kept down and weather-resisting qualities improved.

Food for Thought.

Many motor firms have recently been protesting in the papers against the continuance of various restrictions on trade, which are having the effect of blasting for ever the prospects of the industry. One of the noisiest of these protesters was recently written to by a correspondent for a spare part. After an interval of a clear week a *pro forma* invoice was received with an implication that the part would be sent on receipt of cash. The part was thus obviously in stock. Several questions asked were simply ignored, and the correspondent is still waiting on the firm's good graces. No wonder some makers want protection.

A greeting card received from the D.R.'s of A Divisional Signal Company, of which the artist is a member. The sender, who omits his name, says: "With all good wishes and appreciation for the paper that has raised, even in dark days, many a heated argument, and has for a time dispelled the thoughts of war."

From a "Don R."

The following verses were inscribed on the back of the above greeting card :

You've heard her far, you've heard her near,
By dusty day and murky night;
The throbbing purr and fickle gear,
That wild "hoot-toot" and blinding light,
And fain would quell
Her devilish smell.

This palpitating bi-wheeled steed,
This pampered pet of pre-war days,
Works night and day in Britain's need,
O'er roads well damned her duty plays;
Darts here and there
With missives rare.

In sombre war clouds 'pears a rift,
Portentous signs of fairer day;
I breathe to Heaven, towards you drift
My Christmas Greeting; and I pray
All wars to cease
With coming Peace.

Belt, Chain, or Shaft?

Which is the most popular form of transmission? It is no longer guesswork; the "Which type" referendum has shown in what proportion all such points are favoured. See next week's issue.

For Public Service.

In America, the police, fire departments, tramways, and telephone services use a large number of motor cycles for their superintendents and repairs men. The Birmingham Corporation tramways have been using an 8 h.p. New Imperial combination in this connection for the past twelve months, and the official who has used it has reported very favourably upon the machine, which has now covered several thousands of miles in all conditions of weather. This is only one instance in which the motor cycle is of value in public services.

A20

Ten Million for Roads.

To all motorists it will come as welcome news that new grants amounting to £10,000,000 will be distributed by the Road Board for the reconstruction of roads and bridges. The largest amount previously earmarked in a year for this work was £1,000,000.

To Highway Authorities.

Mr. Rees Jeffreys, secretary of the Road Board, has asked all highway authorities to submit their plans for reconstruction of roads as early as possible. He suggests that the roads and bridges to be first dealt with should be those on which there is likely to be much heavy motor traffic.

Bridges.

By the Road Board £10,000,000 for road improvements it is hoped to facilitate the reconstruction of about 200 bridges.

Roadmenders to be Demobilised.

There are more than 10,000 trained roadmenders on the several Fronts, not counting partly-trained roadmakers in the Labour Battalions. These men are being demobilised, and, with their up-to-date machinery, they may be distributed over the country to reconstruct the roads.

The Humber Recreation Society.

The Humber Recreation Club contributed £1,056 in the year to the Coventry and Warwickshire Hospital, the Coventry Mayor's Fund for Discharged Soldiers and Sailors, the Serbian and other funds. This is a highly creditable record for the society.

To Members of the Regent's Park M.C.C.

Will all members of the Regent's Park Motor Cycling Club and other motor cyclists in the vicinity communicate or send their address to A. C. Robbins, 154, Regent's Park Road, N.W.1, in order that a meeting may be fixed to arrange the club's programme and fixtures for the New Year?

New Lighting Order.

A new lighting Order has come into effect. Under its provisions all vehicles except handcarts and bicycles must carry two forward shining lamps, and *all* vehicles must display a red rear light.

Motorists may use unobscured side lamps, which must have, if electric, bulbs not exceeding 12 c.p., and, if acetylene, burners consuming not more than 14 litres per hour. The diameter of the front glass must not exceed 5in. Head lamps of any size may be used, but their electric bulbs must not exceed 24 c.p. or their acetylene burners 21 litres. All head lamp front glasses must be dimmed with either white paint or the equivalent of one thickness of tissue paper.

This Order applies also to motor cycles, but a head light is regarded as a side lamp if it does not exceed 12 c.p. if electric, or, if acetylene, it has a burner consuming less than fourteen litres per hour. The diameter of the front glass must not exceed 5in.; if a larger head lamp is used, then it must be dimmed with either white paint or the equivalent of one thickness of tissue paper.

A number of sidecars were used during the recent polling at Hull. The photograph depicts some supporters of W. J. R. Bell, the seaman's candidate, being conveyed to the polling booth by sidecar.

ON THE TOKAIDO

A MOTOR CYCLING TOUR IN OLD JAPAN.

By E. V. STEVENS.

THE steamy heat of Japan in July is not conducive to expenditure of physical energy, and in consequence I regarded the suggestion of a motor cycling friend that I should accompany him on a trip by road from Yokohama to Kobe rather as evidence of mental aberration. However, to cut short a long story of vacillation and procrastination, I eventually agreed and we started.

My chum's new 7-9 h.p. Indian having a fierce appetite for petrol and lubricating oil, we arranged a pannier of light hoop iron on the rear carrier of his mount to take three one-gallon tins of petrol and one of oil. The question of obtaining petrol supplies *en route* worried us a little, and we discussed the advisability of sending supplies to railway stations at convenient spots on the road; but our supply of energy gave out, and we decided to trust to luck.

The First Hundred Miles.

The road follows the old Tokaido for the greater part of the way. This is the "Eastern Sea Road," running along the sea shore, the greater portion of which is a beautiful avenue of pine trees. The road itself is now comparatively deserted.

We got away from Yokohama at an early hour, and headed south for the Hakone hills with Mount Fuji, dimly visible some fifty miles distant.

From Yokohama to Yumoto (forty-two miles) the road is undulating, and passes through many straggling towns and villages. A wooden bridge fully half a mile in length spans the Sagami River near Hiratsuka (twenty-four miles). This river, though but a shallow trickle a few yards only in width in the summer, becomes a raging torrent, with a depth of twelve feet and a width of half a mile in flood time.

From Yumoto, a popular holiday resort on the foothills of the Hakone Mountains, there is a steady climb of twelve miles, in which the road rises to an altitude of 3,000 feet above sea level, to the summit of the Nagao Pass. This climb would make an excellent test route for sidecar outfits. Hairpins there are in abundance, and the grade, though never exceptionally severe, gives one's engine no respite from hard pulling.

Plugging carefully through the ever-saturated tunnel at the summit of the pass, we started on the descent, having first paused for a while to take in the fine panorama of Mount Fuji, 12,365 feet, with the mountains of Koshu in the distance. The 1,800 feet of descent into Gotemba (sixty miles) cooled our somewhat heated engines as we coasted down at a brisk pace.

Seven miles south of Gotemba, on the gently falling road that runs across the plain to Numadzu, we passed the lepers' home, conducted by the French Catholic Fathers.

In the busy, sea-coast town of Numadzu (seventy-seven miles), my companion, in his endeavours to avoid a wandering carter, applied his rear brake with such effect that his mount swerved completely about, fell, and demolished one of the panniers holding our petrol reserve. Fortunately the petrol tins did not burst, and we were able to pour their contents into our tanks. The empty tins and the damaged pamier were jettisoned, and immediately seized upon by the crowd of youngsters who had collected to watch the white foreigners.

From Numadzu a flat, broad road through an almost continuous string of villages brought us to the Fuji River, its unstable toll bridge, and the town of Iwabuchi (ninety-two miles). Here the remaining petrol pannier was discovered to be all but adrift. The fall in Numadzu had destroyed what little stability it originally had. There was nothing for it but to empty the remaining tin of petrol into our tanks, lash the spare tin of oil to the Indian's carrier, and cut loose the pannier. This was soon done, and the Indian rider, relieved of the incubus of the wobbly panniers, cut out a brisk pace along the pretty sea shore road, whence charming views of the Suruga Bay were revealed at every turn, to Shidzuoka (112 miles), where we had arranged to take tiffin.

Once Again on the Tokaido.

Shidzuoka is the capital of the prefecture and of the Suruga province. It has historical interest; but to us the mid-day meal was all-important, and history faded into insignificance before the question of whether to get rid of the spare oil supply or be bothered with it. Finally, having filled the oil tank of the Indian, and adjusted the oil pump to give a less generous feed, the tin was sent back to Yokohama by rail.

We spent fully ninety minutes over tiffin, and were, even then, quite reluctant to forsake the coolness of the hotel for the blinding glare of the sun-baked road; but it had to be done.

A few hours' run brought us back on to the Tokaido again, when we opened up a little and soon found our-

On the Tokaido—

selves at the famous Tenryu River. The long bridge was of the usual flimsy construction: a portion, about fifty yards long, next the opposite bank, was under repair, and the deck planking was entirely removed. A narrow gangway, inclined at about 45°, led down to the dry river bed, and another temporary gangway led from the river bed up to the bank. Negotiating these gangways and the river bed proved quite exciting.

We trundled into Hamamatsu (181 miles) at 7 p.m., and, having located an inn, revelled in a hot bath, a cool kimono, and a soft cushion. Having fed, we were soon abed, and, despite all the discomforts of a Japanese mattress, fell asleep almost immediately.

An easy climb up the Honsaka Pass led us to the tunnel at its summit, and, wonder of wonders, instead of the usual surface of deep mud through the tunnel, a concrete roadway! We ran through this tunnel several times "all out" just to experience the feel of such a road surface, and felt greatly refreshed.

Glorious views of mountain, valley, and sea greeted us at each turn on ascent and descent of this pass. Down to the level again, the Toyo River (thirty-one miles) was crossed on a ferry, and a twenty-mile run brought us to Okazaki, our lunching place. The road through Okazaki resembles the Greek key pattern with a dash of the Maze at Hampton Court. In consequence our engines and tempers were warm when we eventually got out of the town and headed away over the uninteresting plain for Nagoya.

This was a lazy day from a motor cycling point of view. We travelled but twenty-three miles to Gifu in the late afternoon, having made arrangements to see the cormorant fishing there at night.

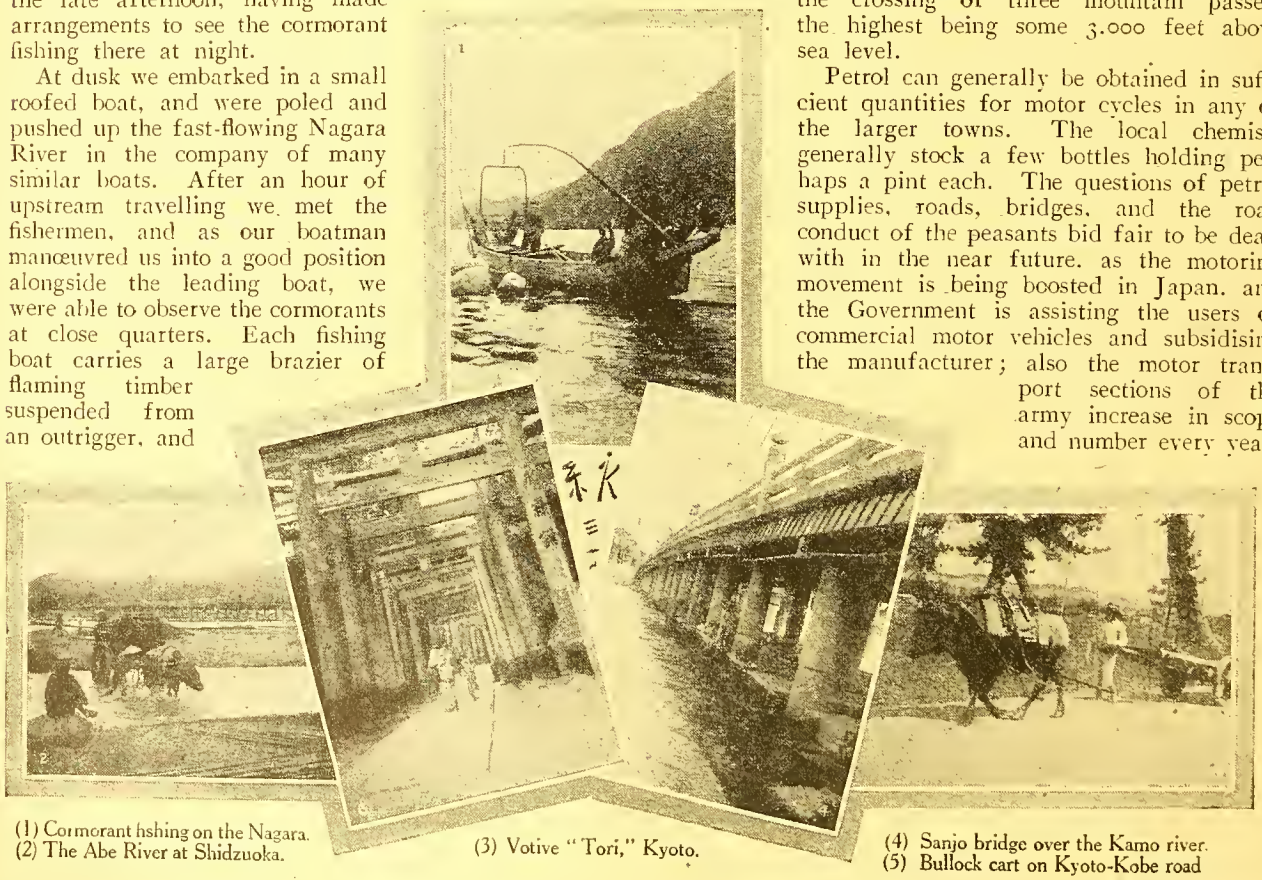
At dusk we embarked in a small roofed boat, and were poled and pushed up the fast-flowing Nagara River in the company of many similar boats. After an hour of upstream travelling we met the fishermen, and as our boatman manœuvred us into a good position alongside the leading boat, we were able to observe the cormorants at close quarters. Each fishing boat carries a large brazier of flaming timber suspended from an outrigger, and beneath this flare the cormorants work. Each bird is controlled by a line about twelve feet long affixed to a short bamboo strip which is secured by a cord passed round the body. A ring about the throat prevents the bird from swallowing the larger fish it catches. The fishermen control from eight to ten birds each; the lines being held in one hand between the fingers. It is wonderful how the fisherman keeps the scrambling, diving birds from becoming entangled. When he observes a bird to have a full gullet he hauls it into the boat, and gentle pressure about the throat causes the bird to disgorge its catch—sometimes as many as twenty fish averaging about four inches long. The bird is then put back into the water again for a fresh foray. Having drifted downstream to Gifu we left the fishermen and returned to our inn.

At Maibara, thirty-seven miles from Gifu, the road comes to the shore of Lake Biwa, and runs along the basin of the lake, though unfortunately not near enough to the shore to allow many glimpses of the lake being obtained. The road is flat and good from Maibara to Otsu, where the lake is left, and a run of but eight miles over a low pass brought us into the important town of Kyoto.

Our journey next morning from Kyoto to Kobe was for the latter part a nightmare. The road was narrow, pot-holey, and literally inches deep in dust. The sun blazed unmercifully down, and many slow-moving bullock carts frequently obstructed our passage.

The total distance from Yokohama to Kobe by the route given in the foregoing is 420 miles, and includes the crossing of three mountain passes, the highest being some 3,000 feet above sea level.

Petrol can generally be obtained in sufficient quantities for motor cycles in any of the larger towns. The local chemists generally stock a few bottles holding perhaps a pint each. The questions of petrol supplies, roads, bridges, and the road conduct of the peasants bid fair to be dealt with in the near future, as the motoring movement is being boosted in Japan, and the Government is assisting the users of commercial motor vehicles and subsidising the manufacturer; also the motor transport sections of the army increase in scope and number every year.



(1) Cormorant fishing on the Nagara.
(2) The Abe River at Shidzuoka.
(3) Votive "Tori," Kyoto.
(4) Sanjo bridge over the Kamo river.
(5) Bullock cart on Kyoto-Kobe road

A LIGHTWEIGHT THAT IS NOT A TOY.

Will the Perfect 200 c.c. Machine Materialise?

FROM time to time we have the suggestion put forward that our existing heavy solo machines will be displaced by an evolution of the 2¾ h.p. Douglas type which will give us a "go-anywhere" mount of 200 c.c. capacity, capable of maintaining good average speeds, of climbing hills as gamely as the 4 h.p. single, and of sticking so tenaciously to its work that a speed gear would only be provided in the nature of an auxiliary accessory to be used in the most awkward emergency.

These desirable features are to be obtained partly by virtue of a hoped for increase of engine efficiency and partly from a more (theoretically) favourable power to weight ratio resulting from the adoption of special metals, and it will be interesting to examine the possibility of attaining these qualities.

Weight Reduction.

The likelihood of increasing the volumetric efficiency of the orthodox type of internal combustion engine is dependent upon the possible amount of power obtainable from a given quantity of petrol, and it seems scarcely probable that the 2 b.h.p. (or slightly more) per 100 c.c. of capacity, developed by the modern single, will be greatly exceeded.

This being so it is difficult to understand how an engine giving a maximum of 5 b.h.p. can possibly equal in performance an engine of twice that power unless the work to be done is reduced in proportion and only enormous weight reduction of the machine could do this when the factors of rider's weight, rolling friction, and wind resistance remain almost constant for both types.

Nevertheless, it is impossible to ignore the effect of the increasing use of aluminium and the possible discoveries with regard to other light alloys which may give us materials as satisfactory as steel for such purposes as frame lugs and tubing, but much has to be done in these fields, and nothing but conjecture can be advanced at present. (Incidentally it is disappointing that after so many years' use of the metal no satisfactory method of soldering aluminium is practised in the average workshop.)

The excessive lightening of parts is not wholly without danger, and the weight of a Douglas engine, for example, could scarcely be reduced by 10 lb. without seriously affecting its reliability in the hands of the non-mechanical rider, whilst any unprecedented increase of power output would require extra flywheel weight and a strengthening of transmission details, thus balancing the saving in the unit itself.

Granting for a moment that a 200 c.c. machine was produced, there can be no shadow of doubt that in the light of our present knowledge it would hopelessly fail to equal the existing type of 4 h.p. single in the latter's own particular sphere, *i.e.*, as a top gear machine, since the small engine's dependence for power on the higher rates of revolution would necessitate at least four gears in order to obtain full output at any road speed, and thus equipped it would be about as sporting and "game" a vehicle to ride as an electric brougham.

With these suggestions in view it is scarcely conceivable that the 200 c.c. "all-purpose" engine designed on existing principles can do otherwise than remain a figment of the journalistic imagination, and, from its constant recurrence, occupy a place of honour alongside the hoary "thunderbolt" and the up-to-date "aerial torpedo" so dearly beloved by Fleet Street.

Perhaps the greatest objection to the concentration of inventive genius upon these miniature machines is their discomfort and the general sense of insecurity they give as compared with machines which weigh a little more than the rider himself; this may be rather a matter of personal opinion, for the writer admits to facing greasy tramlines with comparative equanimity on a T.T. single when the same conditions with a *petite* two-stroke serve thoroughly to "put the wind up."

Notwithstanding individual bias, however, there can be no contradiction of the fact that the heavier the machine, up to a certain point, the more rideable and roadworthy it is, for it suffers less from vibration, is easier to hold to a given course, especially on rough roads, and is generally less fatiguing to ride over long distances.

About the end of 1913, during the ultra lightweight boom, the writer had the misfortune to be testing a machine which approximated closely to the "ideal" specification, *i.e.*, it had a 200 c.c. engine of abnormal efficiency, an emergency gear of 18 to 1, enabling it to climb any hill, and in other respects the equipment was of the full touring order.

An Interesting Test.

The tests were carried out in the Pateley Bridge district in Yorkshire, and the famous Greenhow Hill was successfully climbed, which is no small achievement for a machine of nominally 2 h.p. weighing 110 lb. and carrying a ten stone rider.

It may be said that no machine could have been better or more homogeneously designed, and the engine weight was at minimum for the period, although the latest practice would undoubtedly have allowed considerable saving, while more efficient cooling, combined with valves of one of the latest steels, might have eliminated the alarming necessity for one exhaust

A Lightweight that is Not a Toy.—

valve per 100 miles, which was the actual requirement in the 300 miles test.

The writer was accompanied and observed by a friend mounted on a T.T. Triumph, and although the latter occasionally failed to make a clean ascent of all the abnormal hills he was nevertheless continually compelled to stop and allow the miniature machine to overtake him, this being caused through the low top gear of the lightweight which had to be cruelly overdriven to exceed 25 m.p.h. on the level, whilst the least severe gradients or a stiff head wind reduced it to low gear and a speed of 9 to 12 m.p.h.

Petrol Consumption.

Efficiency, as applied to this engine, had no reference to the amount of work obtained from a given quantity of petrol, for it used three gallons to two consumed by the Triumph, and this, together with several very serious defects which occurred towards the end of the test, caused it to be regarded less as the initiation of a new era than as an abomination unfit to be passed into the hands of the public.

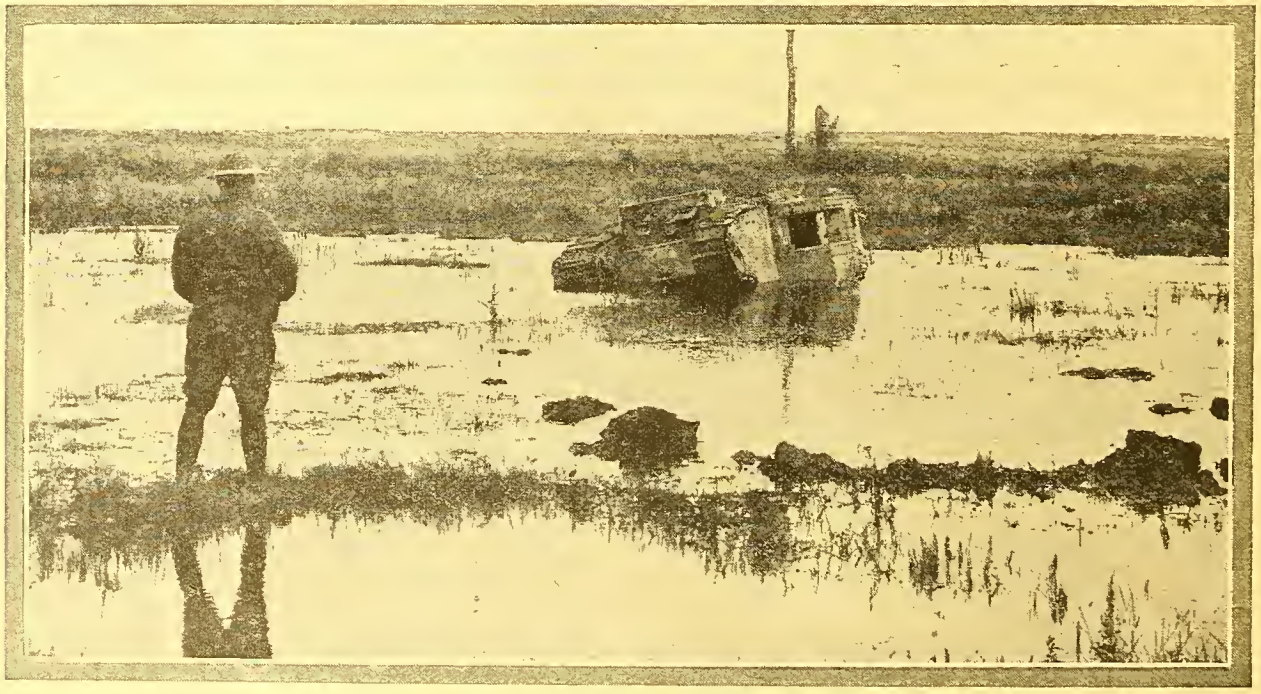
Although it is useless drawing general conclusions from a particular instance, it seems unavoidable that these small engines must depend upon abnormal r.p.m., with correspondingly excessive petrol consumption, and reduction of the latter means a falling off of the former.

Later experiments point rather to an improvement in the maintenance of power than to any startling increase of it in an engine of given capacity; and with the internal combustion motor in its present state of development as unquestionably the most efficient heat engine we know, without some unprecedented innovation there seems little doubt that finality in maximum power output has been reached.

The tendency of the existing 350 c.c. machine is to put on weight, and we may infer that the mount which may eventually supplant the popular 3½ h.p. solo single will be a 3 h.p. flat twin with all the former's doggedness and top gear range, its lightened engine permitting staunch frame and spring work without undue increase of total weight, so that, all told, it might scale about 200 lb. "all on."

Two speeds and a clutch of large area would meet all requirements (provided the public could be dissuaded from ill-treating the machine by attaching the inevitable miniature sidecar!), and a mount so equipped would be infinitely more exhilarating as a sporting solo than one whose tiny engine was eternally screaming at its maximum revolutions with the sound of a demoniac sewing machine.

WHARFEDALE.



In the process of "clearing up" on the Western Front many wrecked and bogged tanks will have to be salvaged.

WAR ROADS.

An item of interest to motorists appeared in *The Times* report on War Railways and Roads. It was stated that the extent of road construction in France may be gauged from the fact that approximately 55,000 square yards of new roads are made, and over 100,000 square yards resurfaced each week. The output of quarries worked by the British having risen from 40,000 tons to 70,000 tons weekly. Last January 3,000 miles of road were maintained; in September 4,500. In this country, too, many war roads have had to be made and maintained, in which direction *The Times* states that the Road Board has helped considerably in the provision of material and the selection of *personnel*.

THE MOTOR CYCLE

AVIATION SECTION

Aerial Passenger Service. London Defences. Altitude Limit.

R.A.F. Exhibition.

100,000 people have visited the exhibition of enemy aircraft at the Agricultural Hall, London, in a month.

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The Cuffley Hero.

Capt. Leefe Robinson, V.C., who brought down the first Zeppelin in England at Cuffley in April, 1917, was among 2,000 repatriated men who arrived at Leith recently.

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Monoplanes in 1918.

This year the Germans began an air offensive against our anti-submarine patrol. It took the form of very fast monoplanes, heavily armed. Consequently our flying boats and other craft were escorted by purely fighting machines, such as the Sopwith Camel.

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German Design.

The trend of German aeroplane design lately has been to substitute for the usual fuselage construction a three-ply shell built up on light wooden formers. It is generally wireless, and has the advantage of being light and strong. *Rien de nouveau sous soleil.* This construction was used in the old racing Deperdussin of 1912 with considerable success.

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A French Airman's Record.

Lt. Fonck, France's "star airman," claims to have brought down altogether 124 enemy aeroplanes. He attributes much of his success to his method of fighting. He used two machine guns simultaneously, and by a method of cross-fire set up a nasty barrage at a distance of about 150 yards.

He regrets that the experiences of the war have added but little to the speed of aircraft, and he thinks that when airmen take up industrial aviation they will turn their attention to the question of speeding up.

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Aerial Passenger Service: London to Harrogate.

Harrogate is the first town in the country to arrange for an aerial passenger service. Mr. G. Holt Thomas, of the Aircraft Transport and Travel Co., with which firm the arrangement has been made, is confident of the services for passengers being in operation by the coming summer.

The famous "Stray," with its 200 acres, in the centre of the town, is to be utilised as a landing and ascending place. The duration of the journey from London will probably be under two hours.

The "Silly" Raids.

We are gratified to learn that the Crown Prince has expressed himself as holding the opinion that the air raids on London and Paris were "silly." For once we are in agreement with the gentleman!

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Aeroplane v. Spire.

A subscription is being taken up by the vicar of St Ives to help defray the damage caused by a British aeroplane colliding with the spire of All Saints' Church. The spire was cut in half, and two portions of it fell in the aisles, causing considerable internal damage. The pilot was killed outright.

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The London Anti-aircraft Defences.

Hauptmann Kleine, who took over command last year of the 3rd Squadron of the German Flying Corps, after Hauptmann von Brandenberg broke his leg while flying to headquarters to be decorated, can testify to the excellence of the London anti-aircraft defences. On two occasions he was nearly brought down by the netting systems suspended from kite balloons (without their baskets), and on his last attempt he reported that the defences were so frequently moved about that further essays hardly seemed worth while!

Marshal Foch.

On his return to France in a destroyer, Marshal Foch was accompanied by an aerial escort, and another squadron followed his train to Paris.

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Indian Aerial Mail.

The ordinary Post Office mails were carried from Charbah to Karachi (328 miles) during Maj.-Gen. W. G. H. Salmond's great flight of 3,028 miles from Cairo to Delhi.

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Altitude Limit.

The international altitude limit of 3,000 metres was recently reached by an Italian observation balloon, a new form of craft, called the Avorio-Prassoni. This type is nearly spherical, and presents little resistance to wind pressure. It looks like nothing so much as a football with an attack of goitre.

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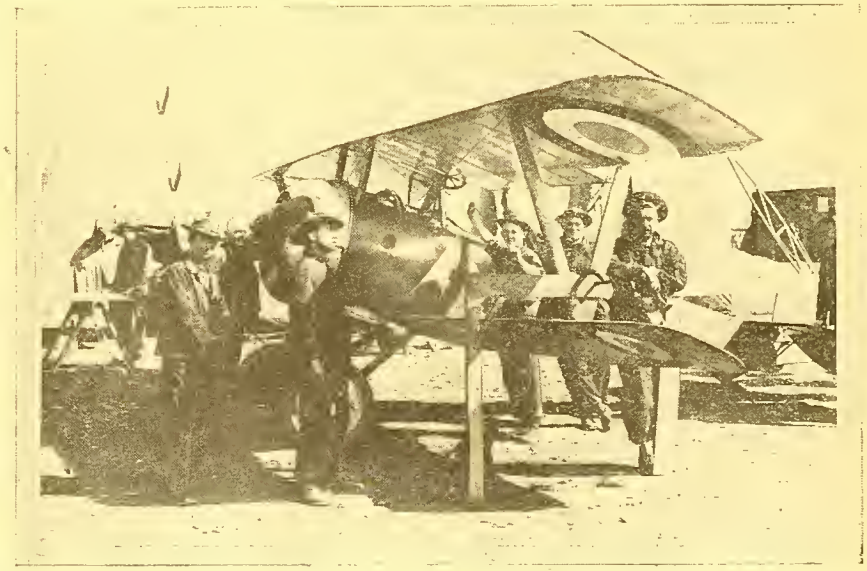
Successful Work.

We now learn that no fewer than 6,123 bombs have been dropped by British aviators on Bruges docks alone, and damage was so continuously inflicted upon Zeebrugge that the quays, railways, and sidings were perpetually under repair. This effective harrying made things so uncomfortable for the enemy that he finally decided to evacuate the port of Bruges.

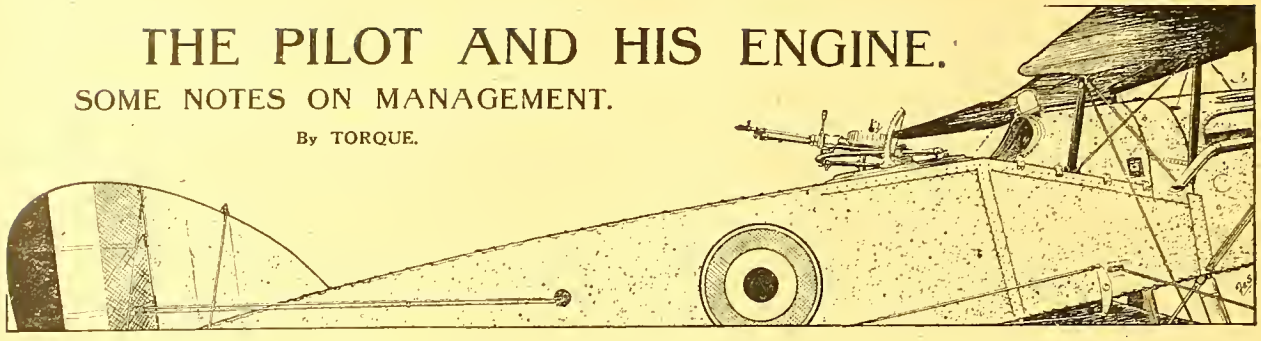


American aviation engineers engaged on repairing damaged aeroplanes at an American aerodrome in France.

THE PILOT AND HIS ENGINE.

SOME NOTES ON MANAGEMENT.

By TORQUE.



IN war flying the offensive spirit is essential. A pilot cannot attack an enemy scout or even conduct a dangerous reconnaissance with real full-blooded dash if the back of his mind is besieged with technical anxieties. Consequently it is desirable that he should not be imaginative. The more he knows about his engine, the more likely is he to lose the swift razor-edge of decision which counts so much towards victory or success. The average war pilot is neither imaginative nor a mechanical expert: a few war pilots of the very highest class conquer the weaknesses which go with imagination and technical knowledge, and succeed on active service despite highly-strung temperaments and engineering skill. Guynemer was one of these rare exceptions. Nevertheless, the less the ordinary pilot knows about choked jets, or seized bearings, or broken valves, or shorted mags. the better: for such possibilities will not then obsess his mind. In peace flying these conditions will be partially reversed. The pilot will tend to become a mere aerial chauffeur; and, like the ground chauffeur, his value will be increased by technical ability. It is only in war that the technical ignoramus tends to make the better pilot.

Indicators, etc.

The pilot receives invaluable assistance in the management of his engine from two natural faculties, assisted by three or four instruments. These aids to engine control may be tabulated as follows:

1. The ear, which detects any falter in the reverberating rhythm of the unsilenced leviathan.

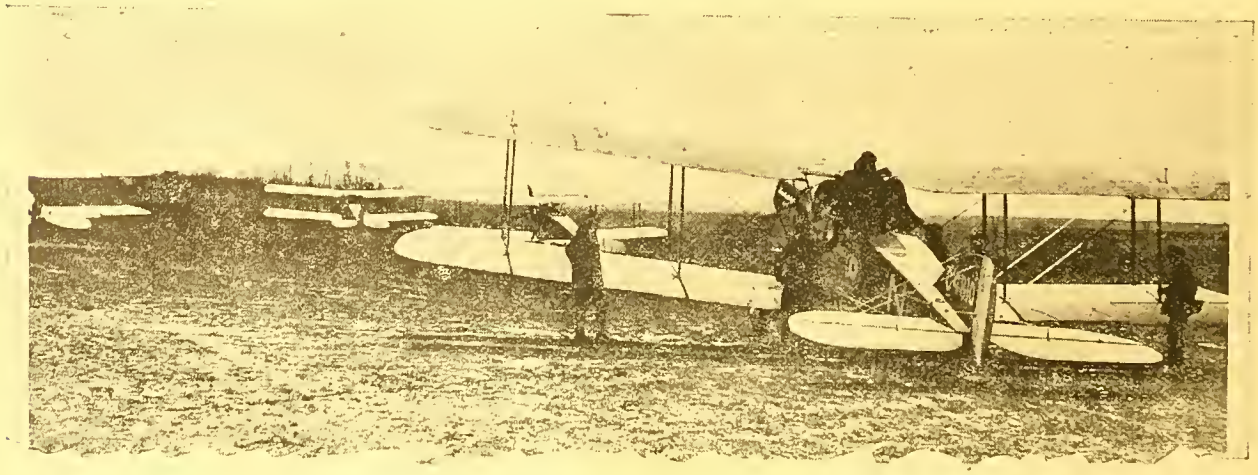
2. The tachometer or revolution counter, which is in perpetual use as described below. It is usually driven through a gear reduction off the timing shafts at about one-quarter or one-half of engine speed, the dial in the cockpit being connected to the engine by a flexible shaft. The tachometer, of course, gives instant warning of any serious defect in the engine: but the first intimation of trouble often comes by ear, as a faint, recurrent miss is not very perceptibly recorded on the revolution counter.

3. The nose, which soon smells out any tendency to overheat.

4. The thermometer. Distant-reading thermometers are often fitted in the water-cooling system, *e.g.*, at the main exit from the cylinder jackets. The pilot knows what the normal exit temperature of the water should be, and the reading warns him if the radiator is holed, if he has been climbing too hard, if his engine is under-cooled for the front on which he is flying (there is a difference between Bagdad and the Murman Coast), or if an oil failure is developing.

5. The oil pressure gauge. This is second only in importance to the tachometer. Too low pressure signifies a leak. Absence of pressure shows that the pump is out of order.

6. The oil thermometer. A few engines are equipped with a second thermometer, which warns the pilot if the oil is becoming frozen as the result of a long dive in arctic weather, or becoming so thinned by heat that its lubricating qualities are no longer adequate. In the former case the engine would be revved up by a short climb or horizontal flight—such an emergency is extremely rare; in the latter, a



One of the last photographs taken of British 'planes during the final attack on the Germans

The Pilot and his Engine.—

dive with engine off would soon chill down the oil again.

7. Petrol pressure gauges and flow meters.

The name of petrol supply systems is legion, and the accompanying indicators vary accordingly. To quote one system as an illustration, the carburetters are normally fed by gravity from a tank built into the top centre section plane. Considerations of wind resistance and the location of the centre of gravity compel the main tanks to be carried near the pilot and inside the fuselage. The risk of gunfire suggests that all parts shall be duplicated. So the gravity tank may be fed from two main tanks, each of which is fitted with two petrol pumps, of which one is wind-driven by a miniature propeller, whilst the other may be mechanically operated by the engine. Either main tank can feed the overhead gravity tank by either pump; overflows will take the excess petrol back to the main tanks when both systems are working. The wind pumps may or may not be fitted with clutches to throw them out of action when the mechanical pumps are acting properly.

A seaplane with wound stripes. At one Italian aerodrome a silver stripe was painted on the machine each time it was hit in action. This one has six.

Controls.

A formidable array of controls require to be mastered.

1. Switches.—These will be not less than three in number. There will be one for the hand-starting magneto, which is almost universal nowadays; and two for the dual ignition. The two latter will be mounted so that they can conveniently be slammed on or off simultaneously by a wipe of the pilot's hand. Subsidiary switches tucked away in unobtrusive corners will control the lighting circuit of the dashboard, navigation lights, landing flares, clothing-heaters, etc.

2. Throttle.—Even in this control variations exist. For example, there may be a large side lever, fixed to the wall of the cockpit, and supplemented by a small thumb lever on the joystick. In a multiple-engined machine, each engine must have a separate throttle, but all the levers will probably be so mounted that they can be adjusted in unison. Such machines are not likely to have a thumb lever on the joystick, as the lengthy connections offer considerable resistance.

3. Spark Advance.—As in road work, this lever is seldom required after the engine has been started and revved up, though engines of very high compression may only take their maximum advance at great altitudes.

4. Altitude Control.—The fall in the density of the atmosphere as the aeroplane climbs causes the ground setting of the carburetter to be too rich. This can be corrected by several methods. The simplest is to reduce the flow of petrol to the carburetter, which again can be effected in a variety of ways, *e.g.*, by closing down an adjustable jet, or by opening an air leak and reducing the suction on a constant jet, exactly as motor cyclists use their "extra air." The altitude correction lever may be fitted so that the throttle lever "picks it up" and shuts it when the pilot dives with his engine off.

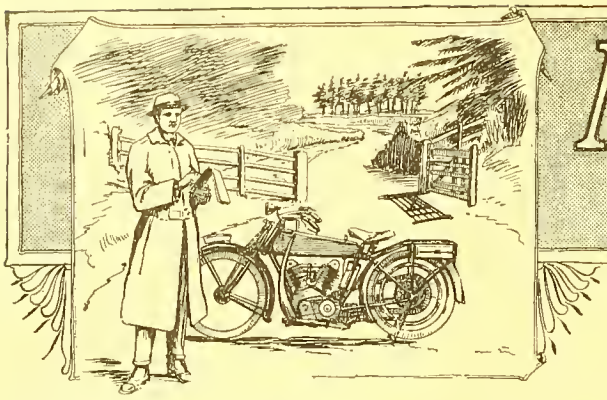
5. Petrol System.—The petrol controls will vary with the arrangement of tanks, pumps, etc., employed. Generally speaking, the main petrol tap will be of substantial construction, and will have three or more positions, *e.g.*, "Right tank," "Left tank," and "Off." In addition, there may be one or more levers for coupling up the wind-driven pumps; and perhaps yet another lever for opening the large escape valves of all tanks in the event of a fire.

6. Radiator Shutter.—The radiator shutter or blind is provided for keeping up the water temperature when flying in extreme cold. It is usually set wide open whilst warming up an engine: otherwise the water may boil before the oil has thinned down properly. At the same time, mechanics sometimes use the shutter to accelerate the warming up process.

Starting Up.

Starting up has been shorn of its ancient terrors by the use of the "booster" magneto and heating lamps. Before starting up a rotary, a generous dose of oil will be injected by hand, as the final throes of the engine on its last run will have flung the oil away from the central parts of the engine, and fresh supplies may be slow in coming through. Before a radial is started it may be wise to see that drainage oil has not fouled the plugs of the lower cylinders. Once these engines are running, the lower cylinders do not receive an excess of oil.

This is the stage at which an impatient pilot or mechanic may damage his engine. Though the heating lamps warm the engine sufficiently to facilitate a start, they do not render all the oil in the engine fluid. The engine must be run as slowly as possible until the lubrication system is working perfectly.



My Ideal Motorcycle

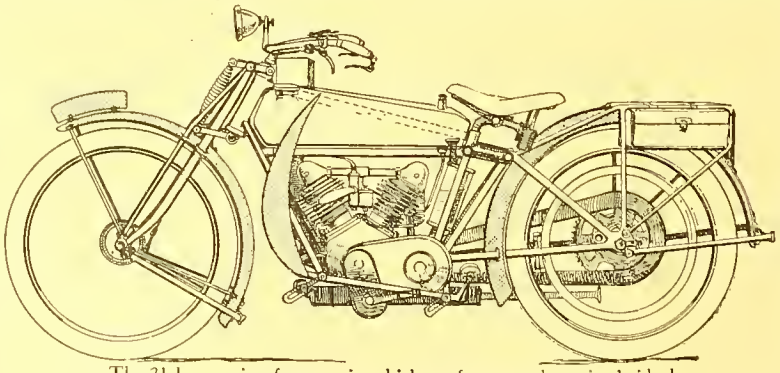
The Requirements of the Business Machine from an Estate Agent's Point of View.

THE ideal motor cycle is not exactly what I propose to set out in this article, but the nearest approach that I can expect to get at the present stage of development for my particular purpose. The ideal, *i.e.*, the perfect motor cycle, would be a beautiful work of art in appearance, yet weatherproof, and hidden away under its graceful lines would be a source of great power. It would run as silently as a watch and need no attention whatever: nothing to do but ride it—a sort of semi-human piece of mechanism costing practically nothing to run and only a little more to buy. Obviously the impossible! Still, there are certain lines on which development will of a certainty take place, and in time the superiority over previous productions will be so marked that we all, except those dissatisfied people on whom progress always depends, shall presume the ideal to be reached.

Speaking as an estate agent with a busy town and country practice, in recent years I have found the motor cycle absolutely indispensable; but as my use of it is much the same as that to which many other business men put it, the needs which I will try to materialise on paper may voice the ideas of riders in other businesses or professions.

A Minimum of Attention.

First, the machine must be always ready for use at a moment's notice: half an hour's tuning up is often impossible, and, unless the machine can be left untouched from one ride and ridden straight away on the next with a fair certainty of good running, one is better off without it. Presumably this need comes under the heading of "reliability." Such obvious necessities as tank filling, tyre pumping, etc., must be so arranged as to occupy a minimum of time.



The 3½ h.p. spring frame twin which conforms to the writer's ideal

Ease of Control.

I do not want a machine that needs a combined technical motor expert and an athlete to manage it. Along with this point goes easy starting. An electric starter is likely to be too heavy a fitment as well as an added complication—better to have a method of kick-start requiring a minimum of effort, or a machine which can be paddled off with ease.

Weatherproof qualities and protection for the rider are, perhaps, the next essential. Big power is not needed; so long as there is sufficient for ordinary solo work, with a reserve to meet unusual conditions—heavy roads, snow, hilly tracks off the beaten roads, etc.—that is all I require. If such power is provided it will be sufficient to take a light sidecar occasionally as a means of transporting surveying instruments, etc.

Comfort and Economy.

Riding comfort is desirable, of course. Economy is not an extremely important point, although, naturally, one wishes to avoid a petrol glutton.

To summarise these points, I want a machine of medium power and weight, weatherproof, easily managed, giving a comfortable position and ready to ride without much attention.

So far, the nearest approach to this desirable mount which I have found is the 3 h.p. Royal Enfield, but it has many points upon which I can suggest alteration. It has a splendid turn of speed and nearly all the power I need, and its controllability is fair, but its kick-starter is awkward.

The engine is too sensitive to small carburation imperfections, and its riding position is anything but comfortable. It scores on the point of reliability, always provided that it has periodical attention to all the usual small sources of trouble; but economy is its great point.

I have no particular preference as to V twin or flat twin; so long as it does its work satisfactorily, runs smoothly and quietly, I care not which type of twin it is. Therefore, taking the Enfield as a basis, I would specify my ideal mount as follows:

ENGINE.—A little more power than the Enfield—a full 3½-4 h.p. V twin air-cooled four-stroke—a

My Ideal Motor Cycle —

shorter induction pipe if it were possible and a general smoothing off of all crevices and corners to produce cleaner appearance. The important point of lubrication must be by a throttle-controlled system through a really visible drip feed. The Lamplugh pump recently described should be all that is necessary; a separate oil tank, similar to the glass reservoir of the Enfield, could be fitted under the rear of the tank.

TRANSMISSION.—The Enfield type of gear to be retained, but a method of control from the handle-bar is necessary. Two speeds are usually sufficient, but I would prefer three. I wish to change gear or declutch without taking the hands from the bars. How it is to be done I do not pretend to say, but surely it is not an insurmountable difficulty.

The drive is to be through chains, much as on present Enfields, but with better protection. I do not desire a totally enclosed drive, or to have to work an hour or so removing cases in the case of chain breakage.

FRAME.—An efficient rear springing system is absolutely essential. The new Douglas type embodying coil springs is the best I have seen so far. The frame design at the head must be a radical improvement on the Enfield; a sloping top tube passing through a saddle tank, two tubes in place of one from the head to front engine carrier, and two from the saddle lug to the gear box bracket.

Tyres to be 28in. by 2½in.

MINOR DETAILS.—Footboards are needed, but with a protecting extension right up to the tank. I want a board sprung at the front end and curved upwards at the rear to form a footrest, thus affording a decided change of position.

MUDGUARDING.—Very wide open guards without valances, similar to those fitted on the Russian models of the Norton, A.J.S., and others.

HANDLE-BAR.—To be a semi-T.T. shape, giving great power over steering. This is distinctly wanting in my present mount, but luckily its design makes it very steady on grease. I do not want the control wires inside the bars. This has been a perfect nightmare to me. I suggest a small tube fitted under the bar, with open ends, of sufficient diameter to accommodate two or three Bowden cables. Otherwise, outside controls for me, please! I am inclined to favour water-cooling instead of the air-cooled engine mentioned, but I have doubts as to whether the advantages outweigh the complications and increased weight, so I stick to air-cooling.

CARBURETTER.—I favour the wick type. I believe there are several makers at the present time experimenting in this direction, and I can safely leave the details in their hands, but I am convinced that this method of carburation will be found to be the most suitable for the engine I have specified.

LIGHTING.—I have found electric lighting by accumulator to be quite satisfactory for the very limited amount of night riding which my work entails.

The machine which I term my ideal business mount after all contains nothing extravagant, nothing which should not be realisable within the next year or so.

F.A.S.

Disabled Men and the Control of Motor Cycles.

The Experience of the Owner of a Norton Sidecar Outfit.

ARTICLES have appeared from time to time in *The Motor Cycle* dealing with the question of the arrangement of controls on motor cycles for disabled riders.

We are indebted to Mr. B. Jefferys, of Castle Green, Kendal, for particulars of his experiences with a 3½ h.p. and a big 4 h.p. Norton sidecar outfit.

Mr. Jefferys, who has an artificial right leg, has covered over 9,000 miles with his sidecar outfit without experiencing any difficulty as regards operating the kick starter or other controls. No conversion was necessary on his machine, but some arrangement on the footboard had to be provided to keep the artificial limb from slipping off it. The machine has to be started before mounting, by standing on the false leg, and this becomes easy with a little practice. It is preferable to have the brake pedal on the left, handle-bar clutch control, and hand change lever for gear. The machine should not be too heavy or cumbersome, and it is much the safest plan to have a sidecar attached. For those who have lost the left leg, the brake should be fitted on the right-hand side. Mr. Jefferys expresses his willingness to advise anyone similarly placed in the choice and requirements of a machine if he will communicate with him through the Editor of *The Motor Cycle*.

Mr. Bryan Jefferys, although unfortunate in having lost a leg, manages perfectly well to manipulate his 4 h.p. Norton sidecar outfit.

BENZOLE.

A LIST OF MANUFACTURERS OF BENZOLE.

ONE of the chief topics of conversation in the motor cycle world is the production, quality, and selling price of benzole. Nothing definite can be stated with regard to the quantity that will be available in the spring, but no doubt there will be sufficient produced to affect the selling price of petrol and keep it at a reasonable level. A big point will be the quality likely to be put on the market, and we hope the formula or specification used by the many benzole producers will be such as to produce a fuel as good as was procurable in pre-war days. The National Benzole Association, 84, Horseferry Road, Westminster, London, has sent a list of manufacturers of benzole, although it may not be possible to obtain spirit from all these firms at the present moment. The current price of benzole is 3s. per gallon.

Altham Colliery Co., Ltd., Altham and Gt. Harwood Collieries, Accrington.
Baird & Co., Ltd., Wm., Bothwell Collieries, Bothwell.
Barrow Hematite Steel Co., Barrow Collieries, Barnsley, Yorks.
Bell Bros., Ltd., Clarence Iron Works, Middlesbrough.
Birchenwood Colliery Co., Kidsgrove, Staffs.
Bird & Son, Ltd., Cardiff.
Blackwell Colliery Co., Ltd., nr. Alfreton.
Bolckow, Vaughan & Co., Ltd., Middlesbrough.
Burt, Boulton, & Haywood, Ltd., 64, Cannon St., E.C.4.
Bowes & Partners, Ltd., Milburn House, Newcastle-on-Tyne.
Bridgewater Collieries, Ltd., Chapel Walks, Manchester.
Brotherton & Co., Ltd., Leeds.
Butler & Co., Wm., St. Phillips, Bristol.
Brunner, Mond & Co., Ltd., Winnington, Northwich. (Address to Secretary.)
Cardiff Collieries, Ltd., Cardiff.
Cardiff Steam Coal Co., Llandradach.
Cargo Fleet Iron Co., Ltd., Middlesbrough.
Carlton Main Colliery Co., Ltd., Barnsley.
Clay Cross Iron Co., Chesterfield.
Coal Distillation Co., Ltd., 145, Albert Rd., Middlesbrough.
Cochrane & Co., Ltd., Ormesby Iron Works, Middlesbrough.
Consett Iron Co., Consett Iron Works, Consett, Co. Durham.
Coppee Co. (Gt. Britain), Ltd., The, King House, Kingsway, W.C.2.
Cortonwood Collieries, Ltd., nr. Rotherham.
Crigglestone Collieries, Ltd. (Otto), Crigglestone, Wakefield.
Crow & Son, Thos., Tar Distillers, Barking.
Cumberland Coal Owners' Association (The Harrington Coke Ovens, Ltd.), Lowca, nr. Whitehaven, Cumberland.
Dixon, Ltd., Wm., Wilsontown, Lanark.
Dorman, Long & Co., Ltd., Redcar Iron & Steel Works, Redcar.
Earl Fitzwilliam Coke Ovens, Parkgate, Rotherham.
Ebbw Vale Steel, Iron, & Coal Co., Ltd., 122, Cannon St., E.C.4.
Ebbw Vale Steel, Iron, & Coal Co., Ltd., Ebbw Vale, Mon.
Ellison, Ltd., Henry, Cleckheaton (for Old Silkstone Collieries).
Ellison & Mitchell, Ltd., Kilnhurst, Yorkshire.
Forbes, Abbot, & Lennard, Ltd., Chemical Works, Shoreham.
Gas Light & Coke Co., Ltd., The, Horseferry Rd., Westminster, S.W.1.
Glamorgan Coal Co., Ltd., Cambrian Buildings, Cardiff.
Guest, Keen, & Nettlefolds, Cwmbran, Mon.
Hardman, Son, & Co., E., Hull.
Hardman & Holden, Ltd., Miles Platting, Manchester.
Hardman, Ltd., Josiah, Milton, nr. Stoke-on-Trent.
Harrington Coke Ovens Co. (See Cumberland Coal Owners' Association.)
Hasland Coking Co., Ltd., The, Grassmoor Collieries, nr. Chesterfield (on behalf of Midland makers).
Holmes & Co., F. G., Thames Tar Works, Lower Rd., Northfleet.
Houghton Main Colliery Co., Ltd., nr. Barnsley.
Ingham's Thornhill Collieries, Ltd., Thornhill.
Knox, Ltd., W. & J., Kilbirnie, Ayrshire.
Lancaster Steam Coal Co., Cwmtillery, Mon.
Lewis Demuth & Co., Springfield Chemical Works, Oldbury, nr. Birmingham.
Lord, J. E. C., Ship Canal Tar Works, Brough Rd., Weaste, Manchester.
Lilleshall Co., Ltd., Priors Lee Hall, nr, Shifnal, Salop.
Low Moor Colliery, Low Moor Ironworks, Bradford.
Major & Co., Ltd., Sculcoates, Hull, & Wolverhampton.
Metcalfe, Ltd., Wm., Church, nr. Accrington, Lancs.
Middleton Estate & Colliery Co., Leeds.
Mitchell Main Colliery Co., Regent St., Barnsley.
National Benzol Association, 84, Horseferry Rd., Westminster, London.
Nees, Ltd., Thomas, Savings Bank Chambers, Darlington.
Newcastle-on-Tyne & Gateshead Gas Co., 35, Grainger St. West, Newcastle-on-Tyne.
Newcastle Benzol Co., Ltd., Milburn House, Newcastle-on-Tyne.
New Monckton Collieries, Monckton & Havercroft.
Newton Chambers & Co., Ltd., Sheffield.
Nimmo & Co., James, Auchengeich, Glasgow.
North-Eastern Bye-Products Association (Reg. Guthrie, Esq.), Newcastle-on-Tyne.
North of Ireland Chemical Co., Ltd., Belfast.
Oxley & Hird, Ltd., Lighthouse Chemical Works, Dewsbury Moor, Dewsbury. (Address all letters to P.O. Box, Heckmondwike.)
Old Silkstone Collieries, Ltd., Barnsley.
Park Hill & Emley Moore Collieries, Clayton West, nr. Hudderefield.
Pease & Partners, Ltd., 92, Northgate, Darlington.
Pemberton Colliery Co., King & Queen Pits, Wigan.
Pinxton Colliery, Ltd. (Coppee), Pinxton, Derby.
Powell-Duffryn Steam Coal Co., Ltd., Cardiff.
Pumpherston Oil Co., Ltd., 135, Buchanan St., Glasgow.
Redbourn Hill Iron & Coal Co., Ltd., Frodingham, Scunthorpe, Lincs. (Address the General Manager.)
Robinson Bros., Ltd., Ryder's Green, West Bromwich.
Ross & Co., Jas., Lime Wharf Chemical Works, Falkirk.
Sadler & Co., Middlesbrough.
St. Helens Colliery Co., Siddick, Flimby.
Samuelson & Co., Ltd., Sir B., Newport Ironworks, Middlesbrough.
Scott, Ltd., Walter, East Hetton Fitting Offices, Hartlepool.
Simon-Carves, Ltd., 20, Mount St., Manchester.
Skinningrove Iron Co., Ltd., Saltburn-by-the-Sea.
Smith, Exors. of Richard, Glasgow.
South Kirby, Hemsworth, & Featherstone Collieries, Hemswood, Pontefract.
South Metropolitan Gas Co., 709, Old Kent Rd., S.E.
South-Western Tar Distilleries, 64, Cannon St., E.C.4.
Staffordshire Chemical Co., Ltd., Chatterley, Tunstall, nr. Stoke-on-Trent.
Stainsby & Lyon, Ltd., Knottingley, Yorks.
Staveley Coal & Iron Co., Ltd., Devonshire Works, nr. Chesterfield.
Stobart & Co., Ltd., Henry, Etherley, Bishop Auckland.
Strakers & Love, Collingwood Buildings, Newcastle-on-Tyne.
Team Bye-Product Coke Co., Ltd., Milburn House, Newcastle-on-Tyne.
Turner & Co., Ltd., Jos., Queensferry, Chester.
United National Colliery Co., Cardiff.
West Cumberland Bye-Products Co., Ltd., Flimby, nr. Maryport, Cumberland. (Address, the Secretary.)
Whitehaven Colliery Co., Whitehaven.
Whitwell & Co., Ltd., Wm., Thornaby Ironworks, Thornaby-on-Tees.
Whitwood Chemical Co., Hopetown, Normanton.
Yorkshire Iron & Coal Co., Leeds.

1919 EXCELSIORS.

Advance Particulars of New Models of Bayliss, Thomas and Co.

THE Coventry-made Excelsior is one of that class of British motor cycle which is designed "from the saddle," and, as is to be expected with so ardent a rider as Mr. W. H. Carson as the guiding hand, the 1919 models reveal much that the rider appreciates.

The new machines will be two in number—a twin sidecar combination and a lightweight solo mount. The former will be obtainable with either 6 h.p. or 8 h.p. J.A.P. engine, and will have 28×3 interchangeable wheels, which can be quickly changed without tools. An exceptionally heavy rim is used with ten-gauge spokes having countersunk nipples, following the practice of the War Office specification for machines for heavy work. All wheels are fitted with Timken roller bearings, carrying a two years' guarantee.

The appearance of the machine differs in some respects from pre-war Excelsiors, inasmuch as the rake of the forks has been increased to 68°, which has considerably improved the steering. The forks fitted are Druid Mark II.

The transmission of the new model is all-chain and enclosed, the gear box being the Sturmey-Archer.

In designing this new model Mr. Carson has had three things always in mind—mudguarding, accessibility, and ground clearance. The last mentioned is 6in., yet despite this it is possible to remove the cylinders without disturbing the rest of the engine. The mudguards are wide and well valanced, and leg shields will be fitted as standard. Another little fitment to assist in keeping the rider clean is a neat metal guard covering the valves and tappets of the rear cylinder. Footboards are fitted.

Provision is made for the installation of a dynamo lighting set if required. The brakes are an improved design of the internal expanding type, the front one having a ratchet by which the brake may be kept in engagement when the machine is standing on a hill.

The tank has a capacity of over two gallons, the saddle height from the ground is 31in., stands are fitted to all wheels, and the spare wheel is carried in a convenient position on the sidecar.

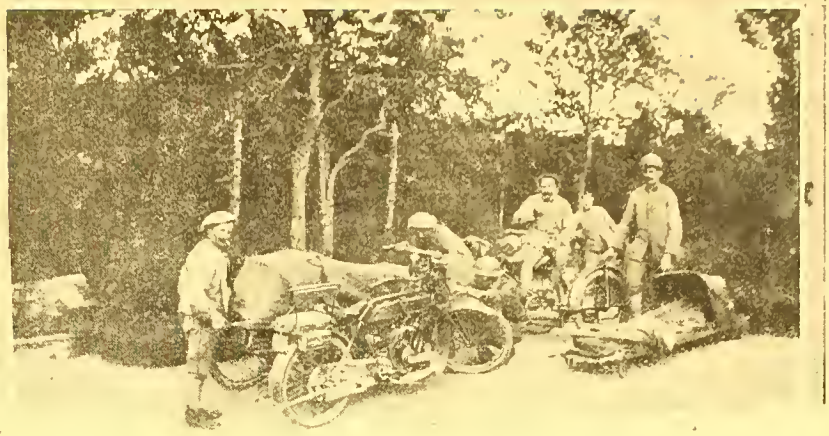
The handle-bars are of the semi-T.T. type, 25in. wide. A point which will receive the closest attention is the matter of tools, and we are told that, in addition to the usual engine tools, there will be a set of box spanners which will fit every nut on the combination.

The sidecar has a roomy body, and a tubular luggage grid, combining a carrier for a petrol tin, is fitted.

It has four-point attachment, the connecting members, which are usually clamped to the tubes of the frame, being integral.

The Excelsior lightweight will be a new design, embodying a Villiers two-stroke engine and a Sturmey-Archer two-speed gear box with hand-controlled clutch; 26×2½ tyres and Druid Mark II. forks are fitted.

PRO PATRIA
V.



THE PARTNERS.

IN the great North-west it used to be the silence that got men down—that crushed them into the innermost recesses of their own souls, as Jack London has it, till they turned and cursed the sound of their own footsteps; but here it is the hideous, shattering din. This war has created many new words, but there still remains a vacancy, equivalent to the French patois *brouhaha*—describing that which is a noise passing imagination and multiplied ten million times, a noise which penetrates to the innermost recesses of one's anatomy, and shakes the very whitewash from the walls of one's dug-out.

Probably many readers of this paper are convinced that shells would not disturb them in the least so long as they are out of the immediate splinter zone. So thought I till a French doctor informed me that every shell that falls within earshot has an immediate and perceptible effect upon the heart. We were occupying a dug-out having a roof thirty feet deep of boulders and tree trunks, secure from any kind of missile, and trench torpedoes were falling outside. A trench torpedo is a pretty ghastly thing, calculated to put the wind up a French Army mule with four years' service, but under such conditions one can afford to laugh at it. The doctor and I were proceeding to do so when the former induced me to take exact count of my pulse, whereupon I discovered the truth that each explosion had an immediate and perceptible effect upon the heart.

Diverting somewhat, my man has learnt five English words. One is "yes," and the other four are unspeakable. When I give him his directions in polished and cultured French, he answers "Yes." It annoys me unspeakably. It is a reflection upon my knowledge of his own language. I string off a carefully pondered sentence, mathematically correct, and he answers "Yes." It is as good as saying, "It is nearly impossible for me to understand you, so I will make no mistake as regards your understanding me."

The events of three nights ago brought bombardments and the aforesaid orderly into my mind. During three hours our two batteries pumped 16,000 shells into the Boche positions, and towards the end of the third hour the Boche became a bit sick of it and responded irritably with futile bursts of mustard gas. The result was that I was gassed *in the boots*, which culminated in my orderly being gassed in the hands—as follows.

Mustard gas, in moderate doses, is rather futile stuff, except when it falls just where the deliverers wish it to fall. If it falls at the door of one's dug-out, one is compelled to evacuate that dug-out in double quick time, nor can it be made use of again till it has been doped with chloride of lime. Everything near to the exploded shell is covered with the "mustard," and to touch it is to court a nasty burn. Hence the bombardment of our battery was to force the latter to evacuate their guns—*i.e.*, the idea of the Hun was, "Stop the beastly bombardment and let's all go to sleep."

It stopped automatically at the end of three hours, and the French lieutenant reminded me that half a dozen raw Americans were sleeping in a wooden hut near to which the gas shells had fallen. These men, naturally, are not yet able to distinguish between an arrival and a departure, and the mild explosion of a gas shell would certainly not be sufficient to put them on their guard. In all probability they would mistake it for a chasseur out shooting chaffinches for the mess in the small hours, and would continue to sleep peacefully.

The Mysterious Wounded.

We started up the old Sunbeam, and with the lint aboard the stretcher set out to inspect.

We reached the foot of a grassy and pine-dotted knoll, high up on which stood the wooden shanty in which the Americans had sought repose. We abandoned the machine, and began to mount in the pale morning sunshine of the mountain side. There were shell holes everywhere in the long grass—small, jagged pits, scarcely large enough to contain an afternoon tea set, where the 77 gas shells had burst, while somewhere about the middle of each group was the huge pit created by high explosive, delivered to spread the gas. We heaved a sigh of relief on observing that the barrage had fallen well below the barrack, on gaining which we were met more or less cheerfully by its khaki-clad and tin-hatted occupants.

Among them, however, were two wounded. One had his thumb and the first finger of his left hand pretty well pulped, and the other had a slight shrapnel wound over the right eye. How and when they had come to receive these wounds neither of them knew. They clung to each other like two flowers of the same root. The man with the injured eye undertook all responsibility for the man with the pulped hand, and

Pro Patria.—

vice versa. If you asked Blind Eye when he was wounded, Pulped Hand began to explain what Blind Eye's lieutenant had said a week ago, and why Blind Eye had fallen out, and that Blind Eye was a volunteer who had enlisted in Montana *as a volunteer.* Blind Eye, standing dazed and numbed during the explanation, but holding on to Pulped Hand's arm lest Pulped Hand should faint, would immediately awake when we requested knowledge regarding his chum, but the sum total of their evidence concerned their regimental data, which they rattled off in unison, glad to get hold of something tangible.

The remaining men knew nothing about this strange pair, and dwelt at length upon what they did not know. One sandy gentleman announced that someone had emptied his flask during the night, and said that he suspected Blind Eye. The summing up of the situation was "Hell," and he proceeded to repeat that sentiment at regular and solemn intervals during the whole of the time he was in our company. He may still be knocking it off, like a funeral knell, for all I know.

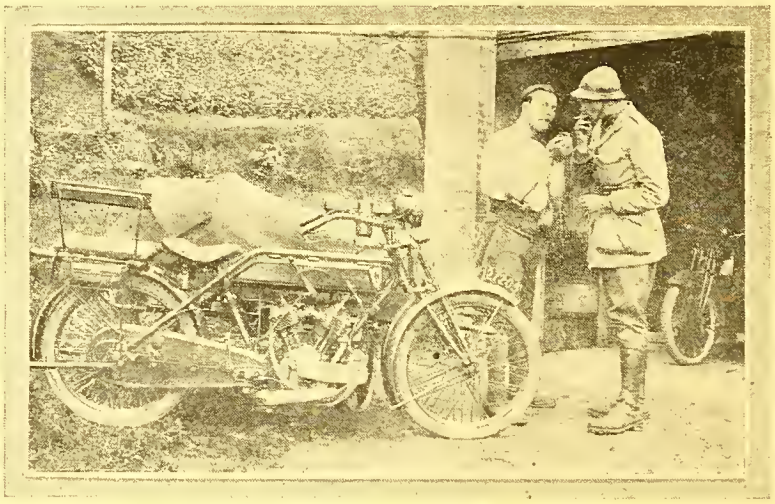
All we could do for Blind Eye and Pulped Hand was to dress them up and tie labels on them — "Wounded by shell fire on the way to the trenches," then leave the American Army to sort them out. During the process Blind Eye stuck to Pulped Hand's arm, as though that were his one and everlasting mission in life, lest Pulped Hand should faint. I solemnly believe Pulped Hand would have fainted had it not been for the sustaining presence of Blind Eye. Then Pulped Hand held the iodine bottle while we dressed Blind Eye, and the fact that Pulped Hand was holding the bottle of offending liquor gave Blind Eye everlasting strength. And all the time Blind Eye was explaining that Pulped Hand was a volunteer, and that his lieutenant had said —— he said —— and Pulped Hand had enlisted in Montana.

"You are old partners?" I asked.

"No," answered Blind Eye. "I never saw him before last night."

How Blind Eye knew what his mate's lieutenant had said a week ago is a matter of mystery, but anyway, they departed as they had come, each speaking when the other was spoken to, and arm in arm.

"How far is it to the hospital, sir?" The question grows sad by iteration. One always divides the distance by at least two. I have told more lies about the distance to hospitals than I have about average speeds. Always the one idea of a wounded man is to get to hospital and rest—and rest—and rest.



Two of the sidecarists at their base depot. Note home-made pillion seat on the Sunbeam.

The one idea of Blind Eye was to get Pulped Hand to hospital. Blind Eye sat on the carrier of the old Sunbeam, and Pulped Hand lay comfortably in the sheepskin on the stretcher, holding Blind Eye's hand. Halfway down Pulped Hand thought he would like to be sick, but he was easily induced to wait till we were beyond the barrage, where he *was* sick, and where Blind Eye filled his tin hat with cold mountain water, and (against orders) gave it Pulped Hand to drink.

So we passed out of the danger zone, and a car picked them up. When I last saw them Blind Eye was helping Pulped Hand up the step and explaining to the American driver how Pulped Hand had enlisted in Montana, while the latter was mumbling Blind Eye's name and number over his shoulder. The American driver put the stopper on by slamming the door and shouting "Right-ho, sonny!"

* * * * * *

A week later I was down at the base, and it occurred to me to trace out some of the poor creatures the sidecars have carried from the fighting line during recent activities. I found our two friends in cots side by side. Both, it appears, were ill from shell shock and exposure. Blind Eye propped himself up on his elbow and said, "Guess he's going on O.K., but he suffered no end during the first forty-eight hours." Pulped Hand, by a gigantic effort, sat himself upright and whispered confidentially, "He ain't got no cigarettes. Buy him some at the American canteen."

We took the five franc note Pulped Hand proferred, and Blind Eye got his cigarettes—enough to last the pair of them a week or two, I guess.

* * * * * *

I say we toiled up the little knoll, in the long grass of which the gas shells had fallen, to where the barrack stood, and that I was gassed in the boots and my man in the hands. It is true. Two days later the aforesaid man came to me with his hands covered with skin burns, and speculated guiltily as to what sort of a disease he had cultivated.

My reply was, "Take my boots out by the laces and bury them in chloride of lime."

He did so. The wonder is that we did not have to bury Blind Eye and Pulped Hand in a similar mineral, for had gas shells fallen upon them during that eventful night they would quietly have been asphyxiated arm in arm, Blind Eye mumbling how Pulped Hand had joined up as a volunteer in Montana, and Pulped Hand muttering Blind Eye's name and number. As to what Pulped Hand's lieutenant said a week ago—but enough!

CHINOOK.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for the opinions of his correspondents.

All letters should be addressed to the Editor, "The Motor Cycle," Hertford Street, Coventry, and must be accompanied by the writer's name and address.

CLUTCH IN COUNTERSHAFT.

Sir,—I should be glad to know if any of your readers have adapted the pedal bracket of a motor cycle as a bearing for a simple clutch, chain from the engine, and belt to the back wheel. If so, perhaps they will give me details.

R. L. BOYD.

THE CONDITION OF THE T.T. COURSE.

Sir,—I read with great interest "The Problem of the Roads" in your last issue. It is indeed high time that something were done towards repairing the roads in many parts of the country. The article reminded me of the roads of the Isle of Man, over which the 1919 T.T., now under consideration, will, I suppose, be held. Last summer I spent a considerable time in the island, cycling several times round the T.T. course, and must say that, before a race is possible, several portions of the road will have to be considerably repaired. From the Keppel Hotel to the Keppel Gate the road is in a shocking condition, becoming worse past the Gate, until the Bungalow is reached. Large channels have been cut into it by the heavy traction engines and waggons used in connection with the German prisoners' camp. Past the Bungalow it is in fine condition for a mile or two, but again becomes bad in the descent into Ramsey. From the Quarter Bridge to Ballacraine there are many pot-holes. These are the worst portions of the course, but others require slight repairs.

Hoping something will be done as soon as possible, and that the classic event will take place next summer, G.C.

PILLION RIDING.

Sir,—I should like to put in a word for pillion riding. I have carried my wife at least 10,000 miles during the last eighteen months on business on a pillion seat, through all sorts and conditions of weather. In August we did 700 miles in five days on a trip to Cornwall. With bicycle, myself and wife, two tins of petrol, and packs on our backs, we scaled a quarter of a ton. The outward journey included the well-known Porlock Hill and hill to Lynton from Lynmouth, then on to Ilfracombe, Launceston, Wadebridge, Bodmin Moor; the return journey through Bodmin, Plymouth, Torquay, then Tavistock, Dartmoor, and the last day Exeter, South Molton, Lynmouth, Exmoor again, Bridgwater, Cheddar, and Bristol. A few weeks ago I had to go to London twice, the return journey being done in the day, and it did not forget to rain during the night after we had left Uxbridge. The mount is a 4¼ h.p. B.S.A., and I find not the least difficulty in steering; in fact, I cannot tell any difference with my regular passenger, but with a stranger it is at once apparent, and steering then requires careful managing. It is undoubtedly the most economical means of transit for two, though not the most comfortable, especially in cold weather

With all thanks to those brave lads and motorists who have, by their courage and endurance, helped to secure peace and made possible once more the pleasures of the open road.

A RURAL SURVEYOR.

Alcester.

THE YORK AND DISTRICT MOTOR CLUB.

Sir,—Some of the members of the above club have discussed the advisability of getting the club restarted, and hope soon to have a meeting to arrange for it to be opened in the New Year. We were pleased to see the "open letter" to the clubs from Mr. Loughborough, the secretary of the A.C.U.

Many of our members have been, and are yet, in the Army and Navy. Some will not come home, others may not for some time; so that in 1919 we may not get into full swing, but think it better to have a start.

The Government recognise that quick transport is necessary for the future development of this country. Let them sweep away the restrictions on motoring as quickly as possible, and reduce the price of petrol, and see that we have a good home supply of spirit—benzole and other spirit—so that a small ring of petrol companies cannot force up the price of petrol to the extortionate figure they have done: for if the industry from a commercial and sporting side is not to suffer the price of petrol must come down to a reasonable figure, and quickly.

Many of our club members joined the local V.A.D. under Capt. Anderson, and have done good service for the last three or four years in taking stranded soldiers and sailors home into the country when there were no trains or other means of conveyance, in many cases taking them fifty miles, and sometimes at midnight or the early hours of the morning. They also drove the ambulance cars when moving convoys of wounded from the station to the various hospitals.

Wishing you every success, and longing for the good time coming when, restrictions swept away and the price of petrol or other spirit at a reasonable figure, we may revel in the joy of the "open road." A very happy Christmas and a prosperous New Year.

G. A. REED, Hon. Sec., York and District M.C.

FUEL.

Sir,—You have had a number of articles recently on the use of benzole, and I see now there is to be a supplementary ration of motor spirit allowed in the form of benzole. I would like to give my experience of three kinds of motor fuel used during the past three years in a 2¼ h.p. Baby Levis. First, I used petrol (during 1915-16), and found that at slow running the plug sooted up, more or less rapidly, and caused a good deal of trouble. At sustained fast running the plug heated up, and the engine became tired, acquiring that "woolly" feeling that other correspondents have already mentioned.

Secondly, with neat benzole, I had three good plugs hopelessly sooted up in 100 miles. The engine overheated alarmingly at the slightest attempt to speed up, and I was very thankful to see the last of the small supply I had.

Thirdly, with a half and half mixture of rectified paraffin and war petrol. This has proved an ideal mixture for my machine when used with a hot air intake and a Euk easy starter. I have steadily run 100 to 110 m.p.g. and have never had a sooted plug or overheated engine. Speed bursts were possible (of course, speed bursts on the Levis do not mean 60 m.p.h.). The only fault with this mixture is less power on hills than was obtainable with 1915 petrol.

Perhaps benzole is not so good as in pre-war days, or perhaps I got a very bad sample; but so long as I can get rectified paraffin and half decent petrol my experience urges me to stick to my mixture.

I would like to take this opportunity of paying tribute to the excellence of the Levis as a handy runabout machine. I purchased mine in December, 1915, and have ridden it winter and summer ever since, mostly for town work. I have done 13,000 miles, and it is good for as many more. The only renewals in the engine are two piston rings, the big end has been taken up once, and I have been highly gratified with the promptitude and courtesy of the makers.

J. FAIRLAM HORN.

CONTROLS.

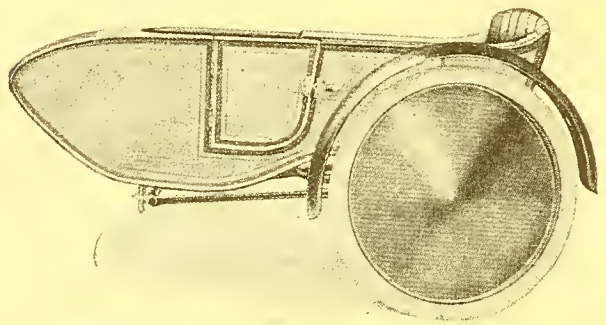
Sir,—The usual question always seems to be arising, "Which do you prefer, English or American controls, and why?" I think that the answer lies with one's particular taste. Undoubtedly there are distinct advantages appertaining to both types. The American type presents a much neater and cleaner appearance. This, of course, suits the people who object to having anything at all on their handlebars. Their chief disadvantage seems to be that twist grips only suit one-lever carburetters, whereas many people prefer two levers; also with twist grips one has nothing beyond the engine to tell one how far the throttle is open.

With English controls one can get a much finer adjustment of petrol and air. Also they are easier to adjust at the carburetter end.

I am glad to see that English manufacturers are sticking to English controls. R.N.

THE POSITION OF THE SIDECAR BODY.

Sir,—I have read with interest the article by "Vedette" on the position of the sidecar body" in your issue of December 12th, but regret I am unable to agree with the writer. When he mentions "designs which held good a decade ago hold good to-day" I differ. What "Vedette" appears to be clamouring for as regards design and distribution of weight have been outstanding features in the Henderson sidecars for the past five years. This is shown by the illustration of Model A, in which, with a 10 st. passenger, there is only a weight of 8½ lb. on the front attachment, the whole weight being distributed and perfectly balanced over the back axle. It is quite possible to ride with the "hands off" with this sidecar. The "pull" and "drag" experienced in the use of many sidecars are entirely due to the incorrect method of weight distribution.



The Henderson sidecar referred to by our correspondent.

In the past, I am sorry to state, it is quite evident that many sidecar manufacturers have paid no attention to the scientific details which either make or mar the correct mechanical principles—in fact, quite nine-tenths of the sidecars one sees on the road to-day seem to have been built to satisfy the unmechanical sidecarist, who requires something pretty to look upon, nicely painted, etc., but who forgets the meaning of the word "utility."

Broken frames, tyre wear, twisted forks, corner crashes—all these revolving round the incorrect design of many so-called sidecars—are too numerous to enumerate, even if I could spare the time.

When will motor cycle manufacturers be convinced that the designing of the sidecar is entirely different in principle from the building of a motor cycle?

LEONARD B. HENDERSON, A.M.I.A.E.

THE COMING CYCLE CAR.

Sir,—Mr. Fenn's reply, on the above subject, to my recent letter, is a gracious acknowledgment of the points set forth in my original communication. It also serves the purpose, for which I am equally pleased, of disposing of my misconstruction of his views, and brings to light the fact that we are equally anxious definitely to establish a true cycle car by eliminating the freakish and impossible, and incorporating only the essential points.

It is no easy task to design a cycle car covering the ideal specification mentioned in my letter, but the result, if successfully achieved, must constitute an original, unconventional, and *true* type.

The position held by the designer is somewhat analogous to the unenviable allocation of that narrow strip of land aptly designated "No Man's Land," with the light car trench on the one side and the opposing trench "freakish designs" on the other! The neutral designer cannot move far without meeting failure at the hands of one of these two enemies; so, to be safe and to avoid these pitfalls, he must dig himself well in between the two and stick to his guns.

Aeroplane construction, combining lightness with strength, lends itself to this end, but this even can be sadly abused by the indiscriminating builder.

Even when one has evolved a suitable body, and has sprung it successfully upon a light strong chassis, the great problem—transmission—that has taxed the ingenuity of every cycle car designer is confronted, and that is where nine out of ten designers succumb.

The cycle car will not be a roadworthy success until a new system of transmission is invented, dispensing with the gear box and differential. This we realised in 1914.

With a body, chassis, and transmission that are both light and yet strong enough for the strenuous tests submitted to them, the problem is nearing solution, but the public demand a tested article, and in these times of restrictions and "Rip-Van-Winkle" officials it cannot be an expeditious business.

However, we are glad to know that Mr. Fenn has this subject seriously at heart, and trust that friendly rivalry will result in the successful accomplishment of our ideals.

THE GIBBONS CYCLE CAR CO.,
E. A. SISSONS.

BRAKING SYSTEMS.

Sir,—"Vedette's" article in your issue of October 10th deals with an important detail which requires threshing out—even to the point of chastisement. Poor designs of brakes badly carried out are all too common, and show a lack of interest of those responsible, as witness, for example, the legion of bent brake rods.

Pivoting a shoe at its centre is not likely to secure evenness of wear, as the motion of the rim tends to draw the "meeting" end of the block into action, and to throw the bearing end of the block out of action. The pivot should be nearer the bearing end. Probably a parallel ruler form of linkwork would be better than any single lever device.

All belt rim brakes, even when the shoe works in the groove, are open to two objections. First, the friction is applied at a comparatively small radius, and therefore calls for an excess of force, or of movement, or both, in applying the brake. Secondly, the force is applied at one side of the wheel with a tendency to distort and to set up a cross strain on the bearings. Neither of these objections is very serious in degree, but they involve principles of which sight should not be lost.

A type of brake which deserves more consideration than it has received is that in which the brake shoes act on the rim, not radially, but laterally, gripping the rim transversely between them when the brake is applied. It has several good points in that it is applied at nearly the maximum radius. It is applied to both sides of the wheel alike, and, above all, in its normal (off) position it offers no obstruction to the detachment or replacement of the wheel. Probably such brakes have not been sufficiently powerful in the past; but, by employing some form of cam, or screw action, it should not be difficult to make them as effective as anyone can desire.

It has long been the fashion to decry the front wheel brake as either useless or dangerous. Properly made and applied there is no reason why it should not be both effective and safe. While powerful, it should also be gradual in action. Any tendency for any kind of brake to seize or grip suddenly is undoubtedly dangerous. The ideal brake would be not quite powerful enough to destroy the rolling contact between the wheel and the road. The maintenance of this contact is less likely to be disturbed, and the stresses on the machine as a whole are much less severe, if the back and front wheel brakes are applied simultaneously. I am strongly in favour of their being coupled, so that they come into action together automatically. The rear one should be arranged to be acting rather more powerfully than the front one all through the range of their operation. If they can also be adapted for both hand and foot control without undue complication so much the better. It is wonderful how quickly one can pull up with properly coupled brakes, and yet the deceleration is so well graded that no symptoms of swaying or skidding manifest themselves. DOUGLAS LEECHMAN.

PRICES.

Sir,—Having noted the letter from "Disgusted" in *The Motor Cycle* of December 12th relative to the price of an outfit he saw advertised at £140, I would like to answer his criticism and to say that I believe I am aware of the make he refers to; but, in justice to the maker, I consider "Disgusted" loses sight of the fact that the price of this outfit has not been increased more than that of other first-class makes.

Let me remind "Disgusted" that he cannot buy a brand new single-cylinder combination of first-class make over 3½ h.p. under £100, and this would not even give him the luxury and advantage of a spare wheel.

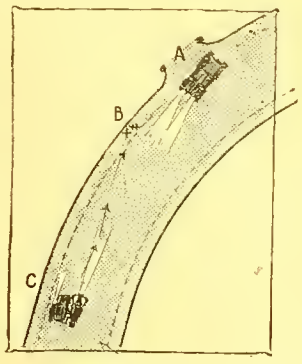
In August of this year I purchased at a well-known London dealer's an 8 h.p. combination (the same make). This machine was a late 1914, it had no spare wheel, and the wheels were not interchangeable. I paid £90 for this outfit. Further, I made one or two alterations, which cost me an additional £10. This machine, I venture to say, commands my highest esteem, and I consider that I obtained value for my money, though the price paid for it was a bit high. Now, after four months' good hard wear, I claim that this machine ranks as the finest and most practical make produced in England. My own satisfaction is so real that I have decided to take the machine with me on my return to the United States early in the New Year.

Regarding the price of £120 he noted some months ago for the same machine, it is easily explained. In view of the ban on petrol, many dealers had these outfits on their hands, and the one offered happened to be made before a further advance came in the cost of production.

In conclusion, let me point out that I have no connection with the firm referred to, other than that of a satisfied customer, who also "plumps" for the British machine. It is *it* and *then some*. J. J. MOORE.

HEAD LIGHTS.

Sir,—Could you not in some way advise car drivers to stop on roads with their head lights turned towards way of road travelling (left)? I nearly killed two children and a lady one dark evening through a car stopped as sketch shows on a winding country road. The car was at gate A, with head lights turned slightly away. I, on sidecarrier C, completely blinded, went to pass the car on left, of course, when I found myself running on the footpath—right on two children and the lady at B—which I could not see owing to darkness caused by the glare of lights. Even till fifty yards away the car seemed to me to be on my right, owing to the circular route.



Illustrating E. Tavernier's comments on head lights.

I think no one should stop unless head lights are pointed towards direction of road, and red showing behind, and it should be a law. E. TAVERNIER.

GEARS AND BELTS.

Sir,—I have read with interest the letter of "Mechanicus," but I always consider I got "caught" in the matter of the chain-cum-belt drive with countershaft gear, and, in my opinion, this arrangement has sounded the death knell of the belt instead of giving it a new lease of life, as was foretold.

My first three-speed epicyclic hub gear machine was in 1911—a Sturmey-Archer on a 3½ h.p. Rover. I used this over 8,000 miles of the hardest solo work imaginable on Colonial roads, with a Whittle belt into the bargain. The only trouble it ever gave me was the breaking of the free-wheel clutch of the pedalling gear. In 1912 and 1913 I used two more 3½ h.p. hub-geared machines, with gears of a different make. The internal mechanism of these gears gave so much trouble that early in 1914 I invested in a high-class 3½ h.p. chain-cum-belt at £95. I found that I now had belt slip more than ever. The machine could not get through the smallest watersplash, and wet grass was of no use to it. No expert could ever cure it, even though the belt were run so tightly as to open the rim.

On consideration of the problem it was quite obvious that the poor old belt should slip. As has been frequently pointed out in *The Motor Cycle*, the belt transmits the same power running at about half the speed; consequently, there is twice the strain on the belt. In addition the drive is much shorter.

The only cure I discovered was to buy an "all chain" machine; but that is another story.

To come back to hub gears. If these gears, by high-class design and workmanship, can be made to stand up to the work of medium-powered solo machines—and my Sturmey-Archer experience certainly indicates that this is possible—removal of back wheel simplified, and lubrication improved, this type of gear has many advantages, and is, in my opinion, the only type which will give the belt a chance to live, and there is no doubt belt transmission has "points."

I never found the "bogey" of rear hub weight to be any disadvantage for touring purposes, the clutch and gear change were by a long way the sweetest in any of the dozen machines I have owned, and further, after going through a watersplash, wet grass, and wet places generally, the belt could be dried by slipping the clutch for a few seconds. The same job on a countershaft means a stop and a hoist on to the stand.

There is also the advantage of a large range of gears with the variable pulley (invaluable in heavy mud), and, further, the engine pulley need not be small. With the machine referred to it was a regular thing to go through watersplashes twenty yards wide and as deep as the hubs (using the Whittle belt, of course), and wet grass was no trouble to it. The belt would give much better service if it were protected from road and wheel splash; and this is surely simple enough. I would like to add a description of roads as we know them in the eastern states of Australia, but, as this letter is already over long, it must be left to another time. The English roads I have seen are high-class pavements in comparison. COLONIAL. A.I.F.

RADIAL ENGINES.

Sir,—My attention has been called to the fact that a certain statement I made in my recent article on the design of aero engines was rather misleading. I said that the radial type of engine was very little used in the Services, which is correct. I did not, however, wish to convey the impression that radial engines had proved unsuitable.

In my opinion, the radial engine has a very big future; and, if Dora would permit, I could give readers of *The Motor Cycle* some very interesting information of experiments that have been, and are now being, made with radial engines.

Before the war I did a considerable amount of work on one of the old 45 h.p. Anzani engines in a Caudron biplane, and a better little engine could not have been found anywhere.

The radial engine has a low weight per horse-power, it is neat in appearance, compact, accessible, and its low overall length is a distinct advantage to aeroplane designers.

The A.B.C. firm has produced several very successful engines of the radial type since the war began, and there are *others*, particulars of which—all I can say is, "Wait and see." GEO. H. BETTINSON.

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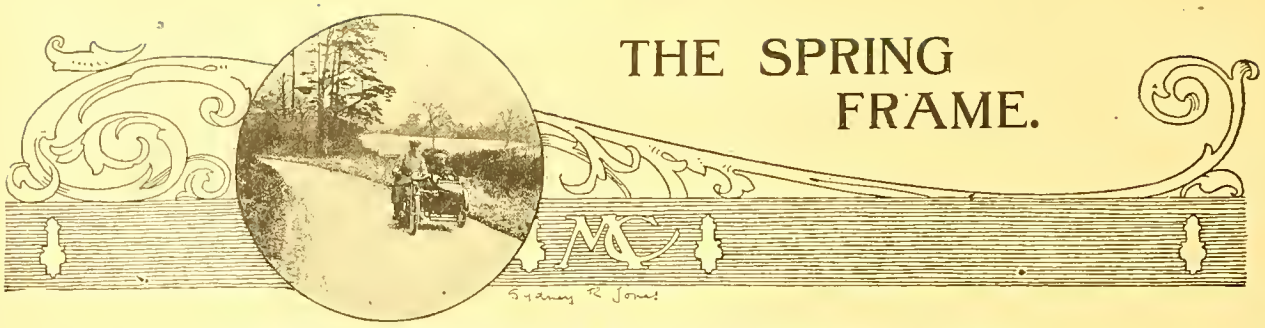

THE SPRING FRAME.

Some Aspects affecting its Construction and Choice.

TO anyone who has followed *The Motor Cycle* campaign in favour of spring frames and the patent specifications of the last few years which may be taken as a direct result of it, it has been very noticeable that much interest is now being displayed in the evolution of a satisfactory method of springing the rear wheel of the motor cycle. Design after design has been produced, only too few of which would even tolerably well withstand the practical test of a season's demonstration work.

The difficulty of springing a motor cycle as completely as its four-wheeled brother is indeed great, for problems which the car designer may practically ignore simply bristle around the single-tracker to baulk the would-be inventor.

In the first place I think a little clearness on the point of what is and is not a spring frame would be desirable, for there are some manufacturers who advertise their spring frames when, as a matter of fact, the "spring frames" so-called have merely been an elaborated extension of the saddle springing to which the footrests are attached.

Springing the Rider.

In saying this I am not attacking any particular invention on these lines, but merely raise the point in order to secure a little purification of nomenclature—indeed, apart from the name of spring frame, I consider that the systems embodied in insulating the rider from the rest of the machine are not only excellent in themselves, but, as far as the cheap mount of the future is concerned, are undoubtedly the best working compromise between our present rigid machines and the elaborate and expensive springing of some of the later designs.

On very rough roads I have noticed that completely sprung machines have a tendency to bounce or otherwise become slightly unmanageable, possibly due to lack of lateral stability or periodic vibrations of the springs, or both, and in machines such as those above mentioned the spring system, while it does not protect the units as a whole from road shocks, introduces no features detrimental to their safety as single-track vehicles, and has the additional advantage of not in any way complicating the simple mechanical details of transmission adjustment and alignment or the fitting of a sidecar.

A Flexible Seat.

One has only to sample such a device to appreciate its comfort—indeed, there are completely sprung frames which are less pleasant than some in which the rider only is insulated, and the type is worthy of wider adoption. The ideal, as far as comfort alone is concerned, would be a flexible suspension after the manner of the Dursley-Pedersen push-cycle seat, and I think that in motor cycle engineering the deepest investigation of such non-rigid structures would be well repaid, for war service has at least taught us that, except in certain parts, too great a weight of metal and over-rigidity have defeated the very end to which these qualities were expected to contribute.

Where complete springing is used there are many important considerations, some of which seem to be almost overlooked by designers; the most obvious, of course, is the necessity for maintenance of lateral rigidity in the rear wheel—not only for the sake of the stability of the machine, but also for the preservation of the transmission alignment.

This necessity is treated very cavalierly by some, whilst others make inadequate provision involving numbers of small bearing pins, shackles, and cranks, which would not retain the wheel centrally for the half of a hard rider's annual mileage.

Weight on the Springs.

Again, the springs may be so placed as to bear the whole weight of the machine and rider normally carried by the wheel spindle, or the shock may be transmitted to them through levers which either increase or decrease the load. In fig. 1 (A), for example, an axle load of 300 lb. would call for a large resistance, but in the type shown in fig. 1 (B) the same load would only need a resistance of 40 or 50 lb., thus permitting a great saving of weight in the construction of the springs—the type represented in fig. 1 (C) bears a load on the springs approximately equal to the actual weight on the axle of the rigid machine.

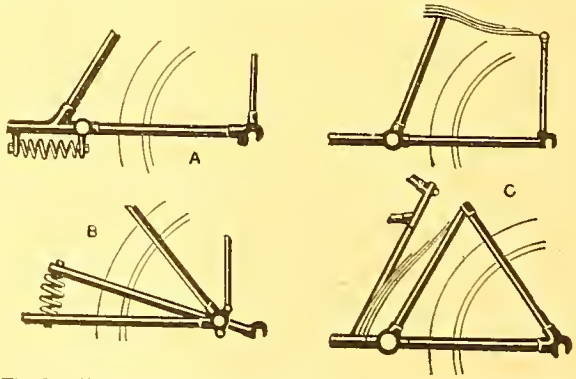

Fig. 1.—Illustrating Wharfedale's remarks on weight distribution.

The Spring Frame.—

Eliminating lateral or rocking motion of the rear wheel introduces some rather involved problems. For instance, any looseness or flexibility in the wheel mounting would result in its attempting to pursue a straight course when making a turn, or in a permanent loss of alignment when subjected to the heavy side thrusts of passenger work.

The effect of turning to the left (or the thrust of a sidecar) is shown in fig. 2, where the dotted lines indicate the position the wheel will tend to assume.

The first type shows the wheel carried in floating links, the second in a subsidiary pivoted fork member, and the third in rear forks which are hinged at the bottom bracket.

The light arrows show the forces forming a couple tending to twist the wheel, and the heavy ones the reactions in the parts which produce the balancing couple keeping the wheel in alignment.

It will be noticed that any looseness in the pin joints of the floating links will allow the wheel to twist, and in proportion to this movement so will the

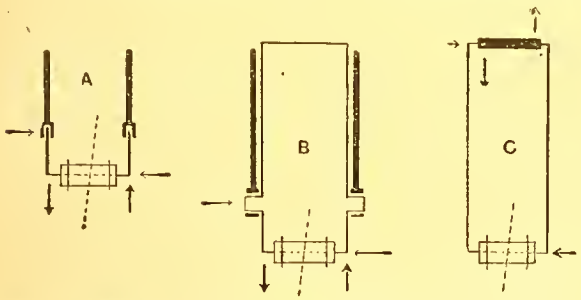

Fig. 2.—Showing the effect of the thrust of a sidecar when turning to the left.

side bearing of the links in the fork ends have to resist the torsion set up, this being due to the fact that the hub spindle and links do not in themselves form a complete figure of great rigidity—a condition well fulfilled by the second type where the lateral stability resultant upon this structure and the possibility of incorporating adequate pivot bearings is practically the same as in a rigid frame.

The third type is satisfactory when sufficiently heavy, since the deflecting force on the rear frame calls for a reaction about three times as great in the bracket bearing, owing to the diversity of the length of the arms of the opposing couples; this necessarily demands great strength in the pivot mounting and ample and well-lubricated bearing surfaces, and the fork tubes also must be sufficiently rigid to prevent either whipping or a permanent set.

Consider next the maintenance of the wheel in a vertical plane, which is of the utmost importance in preventing side roll when cornering. (Here, also, the sidecar imposes stresses altogether unreckoned with in a purely solo mount.)

In the first and third types (fig. 2) these stresses are resisted by the rigidity of the bridging piece, shown dotted in fig. 3, which connects the axle and the springs and compels both ends of the former to move in unison. Play at the shackle pins or flexion of the fork tubes in these two patterns respectively will throw great wringing forces on this bridge piece and its connections, unless the stresses can be so arranged as only to produce direct tension and compression.

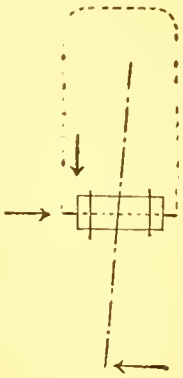

Fig. 3.

Where the wheel is mounted in a subsidiary fork the construction gives a rectangular member as nearly rigid in every direction as is possible.

The Effect on Transmission.

We will conclude by noting the effects of the springing devices upon the adjustment of transmission. In the ideal system the centre of the sprocket or pulley would coincide with the bearing about which the spring wheel oscillates (fig. 4); in practice that system is most desirable where the pivot is nearest to the driving sprocket, and in this respect the patterns where the wheel swings about the fork ends of the normal rigid frame show considerably greater variation in the driving centres than in the other types.

In a chain-driven machine this is a serious factor, necessitating a slack adjustment of the chain, which at the same time must also run on sprockets not so widely varied in diameter as are required in some of our selective two-speed transmissions.

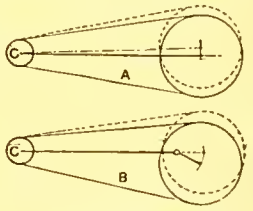

Fig. 4.—The effect of a springing device on the adjustment of transmission.

With belt drive, however, especially if a forward countershaft were embodied, the subsidiary fork, pivoted at the extremes of the rigid stays, would be very accommodating, and should easily prove the lightest and cheapest application of the completely sprung frame, since it involves the least modification of existing rigid patterns and requires lighter springs than any other type whatsoever. WHARFEDALE.

"IXION" AND THREE-WHEELERS.

"IXION" has said, "If you cannot raise the money for a four-wheeler, you must buy a motor cycle, a sidecar, or a cycle car." He assumes that no motor cycles, sidecars, or three-wheelers would be sold if everyone could afford to buy a car. With this the majority of readers will not agree. There are three distinct types of motor vehicles—motor cycles, three-wheelers or cycle cars, and cars. One never thinks of comparing the best of any one class with those of another. Therefore, three-wheelers—the middle class—should not be judged from the standpoint of the owner of a machine in either of the other two classes. The prices of the best of one class are bound to overlap those of the cheapest in the next, and where the owner of the former is at the top the other is at the bottom of his class. VEDETTE.

A selection of questions of general interest received from readers and our replies thereto. All questions should be addressed to the Editor, "The Motor Cycle," 20, Tudor Street, London, E.C.4, and whether intended for publication or not **must be accompanied by a stamped addressed envelope for reply.** Correspondents are urged to write clearly and on one side of the paper only, numbering each query separately, and keeping a copy for ease of reference. Letters containing legal questions should be marked "Legal" in the left-hand corner of envelope, and should be kept distinct from questions bearing on technical subjects.

Bluing Steel.

I noticed in your issue of *The Motor Cycle*, dated about October 3rd, which I have now mislaid, someone gave a recipe for bluing steel. Would you be good enough to repeat this preparation for me, and should you think it quite satisfactory for rebluing gun barrel?—F.A.P.W.

The recipe for bluing metal without the use of heat is as follows: First clean the steel, and then apply the following liquid: Alcohol, 30 grammes; nitric acid, 15 grammes; sulphate of copper, 10 grammes; water, 125 grammes. When the steel is dry, the surface should be polished with a soft woollen rag.

Fitting a Dynamo.

Owing to the shortage of carbide, I have fitted a small 12 v. 5 amp. dynamo to my motor cycle. I have arranged to run it off the engine-shaft (2½ h.p. J.A.P.), geared about 1½ to 1. This gives a splendid light at 10 to 15 m.p.h. Now I should be pleased if you could help me with regard to what apparatus is necessary to regulate the voltage above this speed, as obviously the lamps would soon be damaged at full speed. Also I should like to know what size and type accumulators I should want, if I decide to fix them in place of the carbide generator. I am thinking of incorporating a free-wheel arrangement to prevent accumulator discharging into dynamo at low speeds. I might say that I am a practical toolmaker, with full facilities for making any fine work, but, owing to great pressure, want to avoid experiments.—H.E.A.

The most convenient way of regulating the output of your dynamo will be to put some opposing series coils on the field; in other words, take the main lead from the dynamo and give it a few turns round the field magnet, but in the opposite direction from that in which the shunt coils are wound. Then when the current output begins to increase, the increased current will weaken the magnetic field, and so reduce the output. A diagram of the wiring is shown in the book, "Electricity and the Motor Car," page 37, obtainable from Messrs. Iliffe and Sons Ltd., 20, Tudor Street, London, E.C.4, price 2s. 10d. post free. It is not possible to say exactly how many turns will be required, but you will very soon find this out by a few experiments. The series winding need not necessarily be over the other coils; it may be put on the yoke connecting the poles if this is more convenient. It is difficult to say how many cells you will require without knowing the voltage of the dynamo exactly. The series coils, however, will cut down the voltage somewhat, which is a good thing in this case, as the output is quite necessarily large. Your best plan will be to rig the dynamo up with the series coils, and then test the voltage when the dynamo is supplying a current of three or four ampères; then calculate the number of cells, allowing 2.5 volts for each cell. This will be required when the cells are nearly charged. The capacity of the cells should not be less than 40 ampère hours for a dynamo of that size. With the free-wheel arrangement as suggested, you ought to have a very good lighting set.

IMPORTANT NOTICE.

GOODS MADE IN GERMANY.

The proprietors of this journal, being fully in accord with the recommendations agreed upon at the Paris Economic Conference, give notice that they will not permit the advertisements of new goods manufactured in enemy countries to appear in this publication.

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Pre-ignition.

Kindly help me with the trouble I am having with my 2¼ h.p. New Hudson motor cycle. I have removed the cylinder, piston rings, and all other necessary parts, and have decarbonised it, but still the trouble mentioned below exists. On the level road a fair speed of 15 m.p.h. is obtained, but on opening the throttle in conjunction with the air the engine will first attain a good pace and then keep snatching, and will finally stop. If the throttle is set for 15 m.p.h. on the level, when I tackle a hill with the same setting it will start snatching, and finally stop. I have gone up the same hill flying before trouble began.—F.W.H.

The trouble is probably due to the use of an unsuitable plug, which causes pre-ignition, with the result mentioned. Try a fresh plug with fairly substantial electrodes, which do not project too far into the cylinder.

Countershaft Gears.

What is the name of one or two two-speed countershaft gears suitable for fixing to the bottom bracket of the ordinary diamond frame without having the frame altered?—G.C.B.

You do not say the type of machine for which the gears are required. There are several made for lightweights, including the Burman, Toroga, and Albion. The Albion gear box is also suitable for heavier machines, but has no clutch. The Jardine Co., Ltd., Deering Street, Nottingham, also make two, three, and four-speed gear boxes suitable for attachment to the standard frame.

Chain Breakage.

I find that on my 2¾ h.p. Calthorpe-Jap, with Enfield two-speed gear, the chain rollers are continually breaking off on the high gear chain. This has always been slack, but it cannot stand two links being removed. (1.) Please tell me the reason for the rollers breaking off the chain. (2.) Is there any method of fixing the chain, provided one link is removed?—W.S.R.

(1.) Either you have a chain of poor quality or the sprockets are badly worn. (2.) If you remove one link the chain can be joined again, but it all depends upon whether the adjustment will allow for the chain to be sufficiently shortened. This is a question the answer of which can only be found out by experiment. The insertion of a half link might solve the difficulty.

RECOMMENDED ROUTES.

SHEFFIELD TO LONDON.—C.E.H.

Sheffield, Dronfield, Chesterfield, Mansfield, Nottingham, Bunny, Loughborough, Leicester, Great Glen, Market Harborough, Kettering, Higham-Ferrers, Rushden, Bedford, Elstow, Barton, Luton, Harpenden, St. Albans, Chipping Barnet, Finchley, London.

LANCASTER TO CARSHALTON.—A.L.J.

Lancaster, Garstang, Chorley, Bolton, Manchester, Cheadle, Alderley, Congleton, Kidsgrove, Newcastle-under-Lyme, Stone, Weston, Rugeley, Lichfield, Tamworth, Coleshill, Kenilworth, Warwick, Banbury, Bicester, Aylesbury, Amersham, Chalfont St. Peter, Uxbridge, Hanwell, Brentford, Teddington, Kingston, Raynes Park, Mitcham, Sutton, Carshalton.

A CHAPTER—NOT IN THE BOOK OF ARTEMAS.

The words of Godfrey's of the agents in Lon, in the land of En

NOW there was a cry throughout the land for swift machines, the motive power of which—it was petrol.

AND in those days many did advertise in the Journal of Iliffe and in the Press of Temple but in all such there was not one "dud" to be found, for the machines they did advertise, they were "perfect."

NOW a certain young man who dwelt not in Lon, but in a far County did yearn for one of these "perfect" machines and did send many pieces of Silver to the Owner, even the price which was demanded.

AND it came to pass when that which he had paid for arrived that he called his friends and neighbours together to rejoice with him in the possession of a "perfect" machine. And they cried out with a loud voice "we would see it work."

THEN did the young man use his strength on the kick starter until he was weary with much kicking and the engine would not start. And after he had rested awhile he kicked again saying peradventure it will now start—but of engine fire there was none.

AND they said unto him "run" and he ran. Then did the machine progress—but only so long as he did give it the impetus of his running. And it was evening and it would not start.

NOW on the following morning the young man arose and called in certain Wise men skilled in the mysteries of the four stroke, and the working parts which had been hidden were revealed.

THEN the wise men communed together in the Council Chamber concerning it and said unto the young man "the machine thou hast purchased as 'perfect' verily it is a 'dud.' For behold the big end has gone and the cylinder is somewhat oval. Moreover it is scored so that the gas escapeth. Likewise the gudgeon pin is as the tooth of an ancient man which waggeth in its socket.

ALL this, and more also did they say unto him concerning the machine he had bought. And the young man was amazed being a novice and innocent of the ways of second-hand machines.

THEN did the young man hie himself to the men who had sold unto him the "perfect" machine and did raise his voice in lamentation saying "Give me back I pray thee my pieces of silver and I will return thy machine."

AND they with one accord fell upon him with loud cries of reproach SEEING THAT HE HAD WROUGHT SO MUCH DAMAGE IN SO SHORT A TIME. But his money they did not return.

SO the young man departed sorrowing unto his habitation and his condition was that called "fed up."

TAKE heed my son and hearken unto the voice of Godfrey's for there are many that will sell thee "perfect" bikes but the good ones cometh from the few.

PUT not thy trust in all who seek thy ear, for there are those whose words are like butter, but their performance it is abominable.

TAKE heed my son and hearken unto the voice of Godfreys for guarantees looketh well on paper, yet it is in the reputation of a House and in the overhaul of a machine that lieth thy safety.

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ALLON, 2¾ h.p., 2-speed, and clutch	£58 0
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CALTHORPE, 4-stroke, J.A.P., 2-speed, clutch	45 gns.
CALTHORPE-J.A.P. 4-5 h.p. twin Combination, 2-speed, clutch	—
JAMES, 3½ h.p., twin, 3-speed	£79 0
JAMES, 4¼ h.p., big single, 3-speed	£79 0
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JAMES 5-6 h.p. 3-speed Combination, 28in. wheels	£104 0
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JAMES, 1916, 3½ h.p., twin, 3-speed, clutch, kick-starter	57 gns.
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All advertisements in this section should be accompanied with remittance, and be addressed to the offices of "The Motor Cycle," Hertford Street, Coventry. To ensure insertion letters should be posted in time to reach the offices of "The Motor Cycle," Coventry, or London (20, Tudor St., E.C.4), by the first post on Friday morning previous to the day of issue.

All letters relating to advertisements should quote the number which is printed at the end of each advertisement, and the date of the issue in which it appeared.

The proprietors are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

NUMBERED ADDRESSES.

For the convenience of advertisers, letters may be addressed to numbers at "The Motor Cycle" Office. When this is desired, the sum of 6d. to defray the cost of registration and to cover postage on replies must be added to the advertisement charge. Only the number will appear in the advertisement. All replies should be addressed "No. 000, c/o 'The Motor Cycle,' 20, Tudor Street, E.C.4."

DEPOSIT SYSTEM.

Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with "The Motor Cycle," both parties are advised of this receipt.

The time allowed for a decision after receipt of the goods is three days, and if a sale is effected we remit the amount to the seller, but if not we return the amount to the depositor, and each party to the transaction pays carriage one way. For all transactions exceeding £10 in value, a deposit fee of 2s. 6d. is charged; when under £10 the fee is 1s. All deposit matters are dealt with at Coventry, and cheques and money orders should be made payable to Iliffe & Sons Limited.

The letter "D" at the end of an advertisement is an indication that the advertiser is willing to avail himself of the Deposit System. Other advertisers may be equally desirous, but have not advised us to that effect.

SPECIAL NOTE.

Readers who reply to advertisements and receive no answer to their enquiries are requested to regard the silence as an indication that the goods advertised have already been disposed of. Advertisers often receive so many enquiries that it is quite impossible to reply to each one by post.

MOTOR CYCLES FOR SALE.

A.J.S.

CROW Bros., Guildford.—A.J.S. Agents since 1912. Write us for your requirements. [9777

A.J.S. 1916 6h.p. Combination, detachable wheels, condition perfect; £85.—51, Maplethorpe Rd., Thornton Heath, S.E. [1698

A.J.S. 1914 6h.p. Combination, hood, screen, not used last three years.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1817

1918 A.J.S., 6h.p., War Office model, lamps, horn, only ridden a few miles and as new; £100.—Elce and Co., 15-16, Bishopsgate Av., Camomile St., E.C.3. [0551

A.J.S., 2¾h.p., genuine T.T. machine, came in 4th I.O.M. T.T. 1914, 3-speed, clutch, lamps, speedometer, etc., not done 7,000 miles; 50 gns.—Kelman, 11, Fox Grove Rd., Beckenham. [X1332

A.J.S.—For the earliest possible deliveries of 1919 models, advance specifications and super service, try the A.J.S. Specialists, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0125

A.J.S. Spares; prompt delivery.—Cyril Williams, Chapel Ash Depot, Wolverhampton. [9189

Alldays.

ALLON (three), brand new models, in stock; also 1917 2-speed, clutch model, £44; also 1916 2-speed clutch model, £31/10; also 1916 single speed model, £29/10.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1818

Greeting!

May your Christmas be A Righte Merrie One

—and the New Year bring back the joy of the open road!

Now is the time
to place your order for that new Motor Cycle—get in before the rush and secure one of the following new 1919 models for

DELIVERY JANUARY.

"LEVIS."

"The original lightweight 2-stroke."

"Popular" model, 2½ h.p... £32
Model "E," 2½ h.p., 2-speed £47 10s.

"TRIUMPH."

"You can trust the trusty Triumph."

Type "H," 4 h.p., Countershaft 3-speed £85
Type "LW" 2½ h.p. 2-speed Lightweight ..... £52 10s.

"VELOCETTE."

"The last word in petrol economy."

Model "D," 2½ h.p., 2-speed £40
Model "OL," open frame (lady's)..... £42

THE PREMIER MOTOR COMPANY,

ASTON ROAD, BIRMINGHAM.

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MOTOR CYCLES FOR SALE.

Ariel.

ARIEL (two), 1916 3½h.p. combination, all accessories; £73/10; actually in stock.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1816

Arno.

ARNO, 1915, T.T., red model, very fast. Grado gear, speedometer, lamps; £36.—17, Abbey Rd., Croydon. [1670

Antoine.

ANTOINE, 5-6h.p., Chater-Lea, nearly new, with clutch, kick start, £30; perfect order.—Pallard, 30, Princess Parade, Church End, Finchley, N.3. [1747

Auto-Wheels.

AUTO-WHEEL Model de Luxe, very good condition, 10 gns.—Beech Court, St. Helen's Park Rd., Hastings, Sussex. [1777

AUTO-WHEEL, B.S.A. model, just overhauled by company, with Triumph lady-back tandem, like new; 28 gns.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1806

Bradbury.

BRADBURY and Sidecar, 1914, 2-speed countershaft, kick start, chain drive, speedometer, lamps, in good order; £37.—17, Abbey Rd., Croydon. [1669

Brough.

BROUGH, 1916, 3½h.p. flat twin, in perfect condition, only ridden 2,000 miles; what offers?—Capt. Clayton, Penn, Bucks. [1735

1916 Brough, 3½h.p., Model H., o.h.v., stored since Oct., 1917, lamps and horn, excellent condition; £50, or near.—Box L8,267, c/o *The Motor Cycle*. [1751

B.S.A.

B.S.A., 3-speed, 1919 models in stock.—Reys, 378, Euston Rd. [1308

1919 B.S.A.—Early deliveries at Briggs, Motor Agent, Wellingborough. [X0120

B.S.A.—New model H. chain drive in stock; immediate delivery.—Moss, Wem. [X1377

NEW B.S.A.'s in stock; immediate delivery Model K.—Alexander, Agent, Wallasey Village. [1506

B.S.A., 1913, 2-speed and clutch, reliable, economical; any trial; £25, bargain.—Deane, Matlock Bath, Derbyshire. [X1141

3½h.p. B.S.A. and Coachbuilt Sidecar, free engine, and kick starter; the combination £45.—Wanchope's, 9, Shoe Lane, London. [1838

1919 B.S.A. Models, 78 gns. and 76 gns.; sidecar 28 gns.; immediate delivery.—Wallace Batchelor, Clarence St., Kingston. Tel.: 1809. [1463

B.S.A. Combination, 1914, chain drive, clutch, countershaft 3-speed, owner driven, carriage-built sidecar, lamps, tools, complete.—Peatfield, Crescent, Thirsk. [X1150

B.S.A.—For the earliest possible delivery of 1919 models, advance specifications and prices, sole district agents, The Walsall Garage, Wolverhampton St., Walsall. 'Phone: 444. [X0126

3½h.p. B.S.A. Motor Cycle and cane sidecar, 2-speed, F.E., Philipson pulley, Klaxon horn, lamps, spares, etc., guaranteed in perfect order; £30.—75, Cleave Rd., Gillingham, Kent. [X1324

B.S.A. 4h.p. Combination, coachbuilt, B.S.A. sidecar, carry two, in good condition, lamps, speedometer; can be seen and tried any time; exchange delivery van for baker with cash, or sell.—Fordham, Littleport, Cambridgeshire. [X1331

B.S.A., 1919, all-chain model, £81/18; belt-cum-chain model, £79/16; and one best sidecar, £29/8; actually on premises; also 1916 4¼h.p. combination, all-chain model, £75, like new.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1807

4½h.p. New B.S.A., 1919 models, for delivery from stock, chain-cum-belt, 3-speed countershaft gear, £79/16; all-chain drive models, £81/18; also B.S.A. De Luxe sidecars to fit; exchanges or easy payments arranged.—Wanchope's, 9, Shoe Lane, Fleet St., London. [1837

Carlton.

CARLTON, 3½h.p., Chater-Lea frame, mag., new tyres; £10.—12, Elm Gardens, Hammersmith. [1736

Calthorpe.

1915 Calthorpe-Jap, 2¾h.p., 2-speed, very fast, first-class condition; £25.—Wyatt, Docking. [1649

1916 Calthorpe 2-stroke, not been used for a year; £27/10.—Robertson, 39, Broad St., Peterborough. [1678

CALTHORPE Motor Cycles.—All models in stock for immediate delivery; no permits required.—P. J. Evans, 91, John Bright St., Birmingham. [0955

1916 2¼h.p. Calthorpe, 2-stroke, 2-speed, in excellent condition, just overhauled, new back tyre, lamps and horn.—Sayers, Parkwern, Pembroke Rd, Sevenoaks. [1766

MOTOR CYCLES FOR SALE.

Century.

CENTURY 2¾h.p., £12, special model, very low, fast, splendid condition, new tyre, all accessories, electric light; only sell owing going back to America.—Doulet, 11, Redesdale St., Chelsea, London. [1744

Chater-Lea.

CHATER-LEA, No. 7, 8h.p., 3-speed, coachbuilt side-car, hood, wind screen, new Ang., 1913; cost £115, sell £55.—Perry, Foston, Derby. [X1293

Chater-Villiers.

CHATER-VILLIERS 2¾h.p. 2-stroke, 2-speed, Lucas lamps, etc., late 1916; £42; exchange sporting cycle car, cash adjustment.—4, King Edward's Grove, Teddington, Middlesex. [1642

Clyno.

CLYNO.—Earliest deliveries. Your name on our list ensures this.—Martin Mitchell, Ltd., Stafford. [X1143a

CROW Bros., High St., Guildford, West Surrey agents for the 1919 Clyno. Order now to ensure early delivery. [1553

6h.p. Clyno Combination, 3 speeds, 3 lamps, dissolved acetylene outfit, speedometer, as new; £90.—48, St. Barnabas St., Pimlico. 668 Victoria. [X1334

CLYNO Agents for North Hampshire.—Early delivery of post-war model. Descriptive leaflet on application.—Grover, Smith and Willis, Basingstoke. [1776

CLYNO Combination, with Swan sidecar, enamel and plating in new condition, special Timken taper roller bearings to detachable wheels, dynamo lighting set, extra large accumulators, car tyres on wheels, sidecar fitted with hood, screen, luggage carrier, amperemeter on dashboard, fitted up regardless of expense; the whole in first-class order; can be seen and tried in the Midlands; price 100 gns.—Box 2,592, c/o *The Motor Cycle.* [X1321

Dayton.

DAYTON, 1½h.p., model de luxe, 1914, good condition; £15.—Robinson, Enan Minor, Cornwall. [1788

De Dion.

DE DION Lightweight, low, drop frame, new spring forks, mag., tyres, saddle, etc.; £12.—29, Russell Rd., St. Ann's, Tottenham. [1618

Douglas.

NEW Douglas in stock shortly at Gourlays, Fallowfield, Manchester. [1781

DOUGLAS, T.T., 1914, good condition; £36.—H., 8, St. Nicholas Rd., Brighton. [1643

1915 Douglas, T.T., 2¾h.p. twin, 2 speeds, lamps, beauty; 45 gns.; exchanges.—Below.

1914 Douglas, almost new, 2¾h.p., mag., 2 speeds, clutch, kick, speedometer, lamps; sacrifice, 42 gns.; exchanges entertained.—Wandsworth Motor Exchange, Ebner St., Wandsworth (Town Station). [1710

DOUGLAS, 2¾h.p., 1915, 3-speed, in splendid condition.—42, Fox Lane, Palmer's Green, N. [1620

DOUGLAS Motors.—Earliest deliveries, all models. Book yours now.—Briggs, Motors, Wellingborough. [X0492

DOUGLAS.—Write us your requirements; either new machines or second-hand.—Moffat, Yeovil. Tel.: 50. [1103

DOUGLAS Motors.—Send your name for waiting list now to Gibb, Douglas Expert, Gloucester. 'Phone: 852. [4749

DOUGLAS, 1913, 2-speed, good condition, fast, spares, lamps, etc.; £30, lowest.—47, Hamilton Rd., Reading. [1634

DOUGLAS.—Several second-hand models, in perfect condition; enquiries invited.—Parker's, Bradshawgate, Bolton. [X1166

1915 W.D. 2¾h.p. Douglas, good condition; seen and day at garage, College Villas Rd., Swiss Cottage, London; £36, or reasonable offer. [1611

DOUGLAS, 2¾h.p., 3-speed, Nov., 1917, used two months, perfect, lamps, horn, tools; nearest £57.—Hirst, 46, Thornton Lodge Rd., Huddersfield. [X1169

DOUGLAS, 1916, 2¾h.p., 2-speed, condition as new; cheapest in London; £37/10.—Apply Saturday, or write Sweerts, 14, Poplar Grove, Shepherd's Bush. [1629

DOUGLAS 1914 2¾h.p. 2-speed Combination, sidecar, gondola shaped, enamelled R.A.F. colours very smart set; £50.—84, High St., Marylebone. [1703

BEST Deliveries of 1918 Douglas models, also spares, by the man on the spot, Eli Clark, the pioneer agent, wholesale and retail, Cheltenham Rd., Bristol [0966

SALE, 1916 Douglas, 2¾h.p., free engine, two speeds, new tyre and belt, mechanical horn, tools, excellent condition; £50.—A. K. Rayson, 35, King's Rd., Horsham. [1723

FOR Sale, Douglas, 2¾h.p., 2-speed, T.T. model, 1913 racing engine, new Amac carburetter, spare belt, etc., splendid condition.—Seadell, The Grove, Chigwell Rd., Essex. [1617

2¾h.p. Douglas, 1915 Colonial Model, footboards, etc., tyres as new, all in very nice order and little used, exceptionally powerful machine; £39, quick sale.—9, Tivoli Gardens, Belfast. [1745

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POST 14/3 FREE.

Delivery from Stock.

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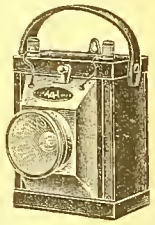

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A. H. HUNT,
115-117, CANNON STREET,
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MOTOR CYCLES FOR SALE.

Douglas.

1914 Douglas, 2¾h.p., 2-speed, Model V., 2 lamps, horn, knee-grips, spare chain, etc., has been little used, the whole in excellent condition; £40.—Hunt, Headbourne Worthy House, Winchester. [1741

1915 Douglas, 2¾h.p., 2 speeds, accessories, Dunlops, almost new, with nice light sidecar, all in perfect condition, ready to drive anywhere, tools, spares; £48, bargain.—Bird, 10, Foundry St., Northampton. [1630

LATEST Pattern 1916 Douglas, 2¾h.p., 2 speeds, not done 1,800, top-hole running condition; f.o.r. first cheque 42 gns.; including lamps, speedometer, horn, tools, knee-grips, etc.; no offers; no dealers; stamped reply.—Plowman, West Bay. [1742

NEW Douglas Motor Bicycles, 2¾h.p. and 4h.p. models. We are now in a position to accept orders for very early deliveries. No permits required. Full particulars and prices will be sent on application.—Robinson's Garage, Green St., Cambridge. [1820

DOUGLAS, Douglas, Douglas.—We have had four years with Douglas motor cycles under active service conditions. Our experience and advice are at your disposal. We can supply a few of the famous All-Black Douglas from stock. Guaranteed early delivery of a limited number of all 1919 models. If you are interested in Douglas machines, call and see us.—Vivian Hardie, Ltd., Douglas Experts, 24, Woodstock St. (off Oxford St.), Bond St., London, W.1. [0918

Enfield.

ENFIELD T.T., 3h.p. M.A.G. engine, 2-speed model; £40.—Horrocks Motor House, Bolton. [X1340

ENFIELD Combination, 6h.p., 1913-1914, splendid condition; £50.—59, North Rd., Wimbledon, S.W.19. [1771

6h.p. Royal Enfield Combination, 1916 and 1917 models, good sound bargains, £85.—Wauchope's, 9, Shoe Lane, London. [1831

ENFIELD 6h.p. Combination, 1916, dynamo lighting, hood, screen, as new; £96.—51, Maplethorpe Rd., Thornton Heath, S.E. [1697

1919 Enfields; combination 110 gns., 2-stroke 50 gns., 3h.p. twin 65 gns.; immediate delivery.—Wallace Batchelor, Clarence St., Kingston. Tel.: 1809. [1464

ENFIELD, two 1916 dynamo outfits, 100 gns. each; also 1914 6h.p. combination, £63.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1809

ENFIELD 6h.p. Combination, with Lucas dynamo lighting, extra heavy oversize tyres, engine recently overhauled; any trial; £100.—Parker's, Bradshawgate, Bolton. [X1163

ENFIELD 1915 3h.p. Twin, 2-speed, kick start, perfect condition, about 2,000 miles, with lamps, tools, petrol; £40.—14, Chipley St., New Cross, S.E.14. [1676

LATE 1914 Enfield Combination, hood, screen, luggage grid, Lucas lamps and horn, mileage 7,000, been well looked after, not riddea for 18 months; bargain, £70.—C. Hims, Ham Green, Redditch. [X1142

1916 Royal Enfield Combination, 6h.p., guaranteed only run 3 months, practically unscratched, P. and H. lamp set, Watford speedometer, storm apron, Klaxon horn, Palmer cords all round; owner killed in France; £85; write for appointment; no dealers.—136, London Rd., Kingston-on-Thames. [1737

3h.p. Royal Enfield, 2-speed, etc., purchased May, 1915, overhauled by makers September, 1918, low mileage owing petrol restrictions, complete with large ebony Lucas horn, and ready for riding, all-weather model, plating and enamel almost as new; £40.—P. Paya, Buttway, Cliffe, Rochester. [1796

Excelsior.

AMERICAN Excelsior, 7-9h.p., 1916, electric lighting model, excellent condition, and perfect running order, 3-speed countershaft gear, all-chain drive transmission; £68.—Wauchope's, 9, Shoe Lane, London. [1835

F.N.

1911 F.N., 2½h.p., 2 speeds, clutch, Bosch; £9/10.—Hedges, 32, Bellevue Rd., Friern Barnet. [1668

6h.p. 4-cyl. F.N., 2-speed and clutch, coach-built sidecar, with hood and screen, good condition; £35.—E.O., 25, Cann Hall Rd., Leytonstone, E.11. [1674

Harley-Davidson.

HARLEY-DAVIDSON 1916 Combination, electrical model, splendid condition; a real snip, £110.—84, High St., Marylebone. [1702

HARLEY-DAVIDSON, 1915, also electric combination, 1915; £75.—Lamb's, 151, High St., Walthamstow, and 50, High Rd., Wood Green, N. [1811

HARLEY-DAVIDSON, 1915, 7-9h.p. electric model, has just been overhauled by Harley expert; price £80.—Apply, Meeks, Dalling Rd., Hammersmith, W.6. [1519

Hobart.

£60.—6h.p. 1916 Hobart, Sturmey-Archer kick starter 3-speed, chain-cum-belt, in fine order, tandem sidecar; a snip.—Foreman, 83, Blackheath Rd., S.E.10. [1794

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READERS of "The Motor Cycle" wishing to insure a motor cycle, sidecar, cycle car, or light car, can obtain quotations for suitable policies by filling in and posting the attached form to the address given below.

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Make of Machine.	H.P.	Date of Manufacture	Present Value.	Registered Number.

Will machine be driven solely by owner?.....

" " " for private purposes?.....

Will passenger be carried on luggage carrier or pillion of motor cycle?.....

Name .....

Address.....

.....

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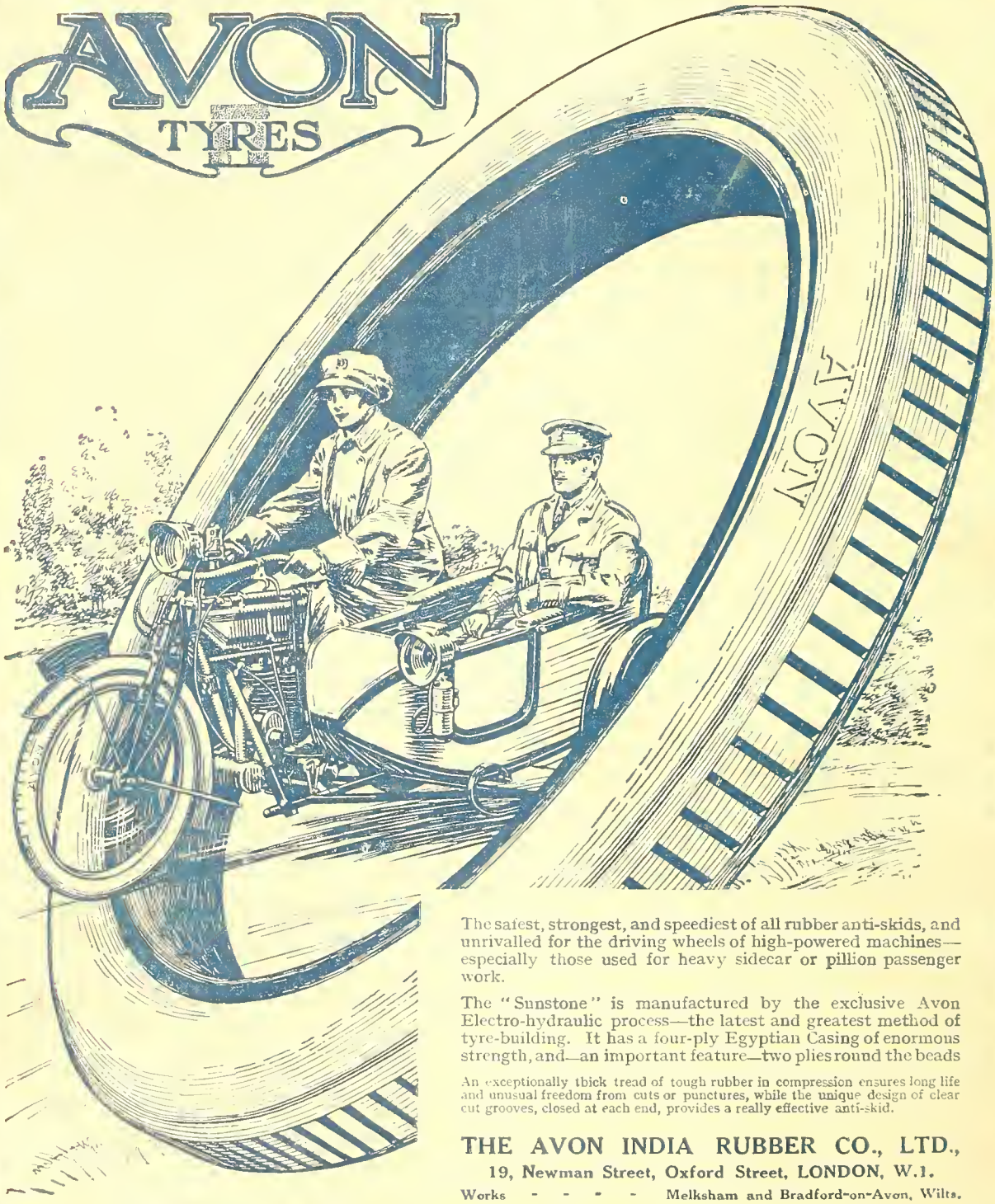

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